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Final Response to BDAT Related Comments Document D003
Volume 1-D

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FINAL
RESPONSE TO BDAT RELATED COMMENTS DOCUMENT

D003: Characteristic Reactive and P and U Wastes Containing Reactive Listing Constituents

VOLUME I-D

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INTRODUCTION

This response to comments document only addresses those comments which were submitted on the proposed land disposal restrictions for those waste codes and general BDAT technologies and issues which relate to Third Third Wastes Treatment Standards.

The commenters presented in this document are grouped according to major concerns of the commenters. This document is comprised of the following sections:

ISSUE CODE 1: General BDAT Aspects
ISSUE CODE 2: D001 - Characteristic Ignitable Wastes
ISSUE CODE 3: D002 - Characteristic Corrosive Wastes
ISSUE CODE 4: D003 - Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
ISSUE CODE 5: D004/D010 - Characteristic Wastes for Arsenic and Selenium and K, P, and U Wastes Containing Arsenic and Selenium
ISSUE CODE 6: D005 - Characteristic Wastes for Barium and P013
ISSUE CODE 7: D006 - Characteristic Wastes for Cadmium
ISSUE CODE 8: D007 - Characteristic Wastes for Chromium
ISSUE CODE 9: D008 - Characteristic Wastes for Lead P and U Wastes Containing Lead
ISSUE CODE 10: D009 - Characteristic Wastes for Mercury P and U Wastes Containing Mercury
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ISSUE CODE 24: K011/K013/K014 - Acrylonitrile

ISSUE CODE 25: K015 - Still Bottoms from Benzal Chloride

ISSUE CODE 26: K021 - Spent Antimony Catalyst.

(No Comments Were Received for this Waste Code)

ISSUE CODE 27: K046 - WW Treatment Sludges from Manufacturing, Formulating, and Loading of Lead-Based Initiating Compounds

ISSUE CODE 28: K060 - Ammonia Still Lime Sludge.

(No Comments Were Received for this Waste Code)

ISSUE CODE 29: K061 - Electric Arc Furnace Dust

ISSUE CODE 30: K069 - Emission Control Dust/Sludge from Secondary Lead Smelting

ISSUE CODE 31: K071, K106 - Mercury Cell Process Wastes

ISSUE CODE 32: K073 - Chlorinated Hydrocarbon Wastes.

(No Comments Were Received for this Waste Code)

ISSUE CODE 33: K086 - Residues from Ink Formulation

ISSUE CODE 34: K100 - Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting

(No Comments Were Received for this Waste Code)

ISSUE CODE 35: Wastes Containing Cyanide

ISSUE CODE 36: K017 - Wastes from the production of Epichlorohydrin

(No Comments Were Received for this Waste Code)

ISSUE CODE 37: K028,K029, K095, K096 - Production of 1,1,1-Trichloroethane

ISSUE CODE 38: Wastewaters containing BDAT Constituents

ISSUE CODE 39: K022 - Wastes from the Production of Phenol/Acetone

ISSUE CODE 40: K025 - Distillation Bottoms from the Production of Nitrobenzene

ISSUE CODE 41: K035 - WW Treatment Sludges from the Production of Creosote

ISSUE CODE 42: K026 - Stripping Still Tails from the Production of Methyl Ethyl Pyridine

(No Comments Were Received for this Waste Code)

ISSUE CODE 43: K083 - Distillation Bottoms from the Production of Aniline

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ISSUE CODE 45: F024 - Production of Chlorinated Aliphatic Hydrocarbons

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(No Comments Were Received for this Waste Code)

ISSUE CODE 50: K037

(No Comments Were Received for this Waste Code)

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Commenters are identified by both commenter number and commenter name. Comments within each section of this document have been assigned a sequential comment number.

Issues were obtained from the original comment submittal and were categorized based on the grouping specified above. The Agency's response to each comment follows immediately after the text of the document. For responses related to capacity issues, the reader should review the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume II Capacity Related Comments." For information regarding broad policy questions, the reader is directed to the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume III Policy Related Comments."

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No Comments Were Received for this Waste Code

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No Comments Were Received for this Waste Code

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Comment Number: 4-A-1
Docket Number: LD12-00124
Commenter: Rollins Environmental Services
Issue: D003-Characteristic Reactive Waste and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: → Deactivation Technology Alternatives

DEACTIVATION AS A TREATMENT TECHNOLOGY

EPA raises the issue (Preamble, p. 48419-20) as to whether "Deactivation" is an appropriate required treatment technology for certain characteristic wastes, or whether a series of technologies should be spelled out -- e.g., "thermal destruction, specialized incineration ...".

We see no problem in using the general term "deactivation", *if* the Preamble to the final regulation makes clear which technologies are included in that term. Otherwise, there may be varying interpretations as to whether or not a particular technology is considered to provide "deactivation" of a given waste.

Again, with respect to D003 "explosives, water reactives, and other reactives", EPA suggests that incineration is a proper method of "deactivation". Once again, this should be made explicit.

COMMENT NUMBER: 4-A-1
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Deactivation Technology Alternatives
RESPONSE:

EPA appreciates the commenter's support of "deactivation" as a treatment standard. The Agency believes that incineration is an applicable treatment technology for wastes in the D003 Explosives Subcategory, D003 Water Reactives Subcategory, and D003 Other Reactives Subcategory. See 40 CFR Section 268 Appendix VI for a list of other applicable technologies that used alone or in combination can achieve this technology standard.

Comment Number: 4-A-2

Docket Number: LD12-00143

Commenter: General Motors Corp

Issue: D003 - Characteristic Reactive Wastes and

Subissue: P and U Wastes Containing Reactive Listing Constituents

Comment: Deactivation Technology Alternatives

Deactivation as a Treatment Standard

GM agrees that if deactivation is promulgated as a method of treatment for certain subcategories of D001, D002, and D003 wastes (page 48419), rather than treatment to achieve the existing characteristic levels, the actual method of deactivation for each waste can best be determined by the generator or the treater.

COMMENT NUMBER:	4-A-2
DOCKET NUMBER:	LD12-00143
COMMENTER:	General Motors Corporation
ISSUE:	D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Deactivation Technology Alternatives
RESPONSE:	

The Agency appreciates the commenter's support of "deactivation" as a treatment standard. However, EPA believes that the waste must be "deactivated to remove the characteristic" to meet the standard. EPA has developed a list of applicable technologies for each subcategory where "deactivation" is the promulgated standard. The generator may choose from this list of technologies. See 40 CFR Section 268 Appendix VI for a list of technologies that can achieve the "deactivation" standards.

Comment Number: 4-A-3
Docket Number: LD12-00164
Commenter: Institute of Chemical Waste Management
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: 3) Deactivation Technology Alternatives

DEACTIVATION

The Agency is proposing deactivation as the treatment standard for D001, D002 and D003 waste codes. In addition, the Agency is asking for comment on whether to allow other methods. The Institute previously has taken the position that LDR standards should allow the use of a variety of treatment methods. Therefore, the Institute would support the Agency proposal to specify thermal destruction, incineration, chemical oxidation, chemical reduction, or controlled reaction with water as treatments for these waste codes.

COMMENT NUMBER: 4-A-3
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Deactivation Technology Alternatives
RESPONSE:

The commenter specifies several technologies that he believes should be listed by the Agency as deactivation technologies. The technologies specified by the commenter can be used to treat wastes in some of the characteristic waste subcategories. See 40 CFR Section 268 Appendix VI for a list of applicable technologies that used alone or in combination can achieve the "deactivation" standard for each specific subcategory. See also Section 268.42, Table 1 for a detailed description of all technologies referred to by a five letter technology code.

Comment Number: 4-A-4
Docket Number: LD12-00179
Commenter: The Dow Chemical Company
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Deactivation Technology Alternatives

XXV. DOW AGREES THAT DEACTIVATION IS AN APPROPRIATE TREATMENT TECHNOLOGY FOR D001 OXIDIZERS AND D003 REACTIVE WASTES

54 Fed. Reg. 48,421, column 3

The Agency has proposed deactivation as an appropriate treatment technology for D001 oxidizers and D003 reactive wastes. Dow agrees that deactivation as a method of treatment is appropriate for these wastes. Generators may have different deactivation capabilities and should not be precluded from using one over another. Large facilities, such as those operated by The Dow Chemical Company, have their own TS&D facilities, including incineration, and can deactivate D001 oxidizers or D003 reactives, which are generated sporadically and in small quantities, effectively and safely using thermal destruction. Thermal destruction of these wastes, such as peroxides, perchlorates, hydrides, azides and permanganates completely removes the hazardous characteristic with no exposure to human health or the environment.

COMMENT NUMBER: 4-A-4
DOCKET NUMBER: LD12-00179
COMMENTER: Dow Chemical
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Deactivation Technology Alternatives
RESPONSE:

EPA appreciates the commenter's support for the "deactivation" standards and agrees with the commenter that incineration is an applicable deactivation technology for D001 oxidizers and some D003 reactive wastes. See 40 CFR Section 268 Appendix VI for a list of additional technologies that can achieve the "deactivation" standards.

Comment Number: 4-A-5
Docket Number: LD12- 00172
Commenter: HWTC
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing reactive listing constituents
Comment: - Deactivation technology alternatives

3. Definition Of Deactivation

EPA needs to clarify the definition of deactivation to include incineration and other controlled thermal destruction technologies, and to eliminate those unprotective methods of deactivation. Otherwise, merely adding sand to a waste may be considered to be "deactivation" by a given generator. Moreover, we oppose specifying or allowing open burning and/or open detonation (OB/OD) as a sanctioned means of deactivation. First and foremost, controlled high-temperature rotary kiln incineration should be defined as a deactivation technology as the docket submissions of Atlas Environmental and Reactive Waste Services attest. OB/OD should only be considered where problems of technical feasibility are raised due to the nature of the ordinance, or where capacity considerations require the use of OB/OD on an interim basis.

COMMENT NUMBER: 4-A-5
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Deactivation Technology Alternatives
RESPONSE:

EPA agrees with the commenter that guidance should be given to help the regulated community understand what is meant by "deactivation". A list of technologies that when used alone or in combination can achieve the "deactivation" treatment standards is included in 40 CFR 268 Appendix VI. The Agency also agrees with the commenter that high temperature incineration is a deactivation technology. It is included in the Appendix VI list.

With regard to open burning/open detonation, EPA is not responding substantively to this comment. The issue of whether open burning/open detonation is land disposal was settled in earlier rulemakings. See 51 FR 40577 (November 7, 1986), 52 FR 21011 (June 4, 1987), 53 FR 31158 (August 17, 1988). EPA did not reopen this issue for comment, did not solicit comment, and is not responding substantively to those commenters raising the issue.

Comment Number: 4-A-6
Docket Number: L010-00031
Commenter: Hazardous Waste Treatment Council
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Deactivation Technology Alternatives

C. D003 Reactive Waste

The HWTC supports deactivation as a method for the BDAT treatment standard for explosives, and water reactive subcategories. Example of acceptable deactivation technologies must be provided, such as chemical treatment, incineration, etc., however, to ensure that proper treatment is encouraged.

For D003 wastes in the Reactive Cyanide subcategory, the HWTC urges EPA to technology transfer the numeric cyanide treatment standards from the metal finishing waste subcategory. The same performance standards must be specified, otherwise generators will bypass treatment of these cyanides by manifesting their waste as D003.

For D003 wastes in the Reactive sulfide subcategory, the HWTC will provide EPA with data on treatment and performance standards in the near future. All of our members who treat inorganic waste currently chemically convert reactive sulfides to insoluble metallic salts by adding iron or copper.

Although there are currently no EPA approved methods for reactive sulfide in SW846, many of our members use tests in Standard Methods for the Examination of Water and Wastewater, 16th edition, Method 427. Also, another test is used in which a sample is subjected to a low pH, and the headspace above the sample is tested for H_2S using Draeger tubes calibrated at NIOSH PEL levels.

COMMENT NUMBER:	4-A-6
DOCKET NUMBER:	LD12-00031
COMMENTER:	Hazardous Waste Treatment Council
ISSUE:	D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Deactivation Technology Alternatives

RESPONSE:

EPA appreciates the commenter's support for the "deactivation" standard for D003 explosives and water reactive subcategories. The Agency agrees with the commenter concerning wastes in the D003 reactive cyanide subcategory and standards were developed based on the metal finishing wastes. For the reactive sulfide subcategory, EPA is promulgating "deactivation to remove the characteristic of reactivity." The Agency agrees with the commenter that chemical treatment of reactive sulfides to insoluble metal sulfides (such as copper or iron) is an applicable deactivation technology.

The Agency appreciates the commenter's suggestions for a sulfide analytical protocol. EPA is currently in the process of trying to develop such a protocol and will consider the commenter's suggestion.

Comment Number: 4-B-1
Docket Number: LD12-00043
Commenter: CyanoKEM
Issue: Characteristic Reactive Wastes and P and U Waste
Subissue: Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

CyanoKEM submitted extensive data on cyanide treatment for development of treatment standards for electroplating waste (see CyanoKEM submittals WJZ-184-88, 022-89, and 077-89; William J. Ziegler to Jim Berlow; August 29, 1988, February 21, 1989 and April 24, 1989 respectively. (Docket No. F-89-LD10-FFFFP) for comments on January 11, 1989 Proposed Regulation, 54FR1066). For ease of review, CyanoKEM is resubmitting data on D003, as well as F006 through F009 from the same time period as previously provided EPA in developing cyanide BDAT for electroplating waste. All analytical QA/QC data pertaining to treatment of these waste streams has been included in the above documents, which are all contained in the RCRA docket to the 2nd Thirds rule (LD10).

Various size and types of waste streams of D003 wastes are received from salts and solids in drum quantities to bulk liquids up to 5000 gallons. Table II-A shows examples of these waste streams comparing waste quantities and cyanide and iron concentrations for various wastes treated during February 12 to March 26, 1987 (i.e.,period of treatment data used to develop F006 through F009 non-wastewater treatment standards) with recent D003 waste receipts at CyanoKEM (i.e., July 24 to October 30, 1989).

Examination of this data indicates that D003 waste streams received at CyanoKEM average about 40,000 to 50,000 mg/Kg total cyanide and 7,000 mg/Kg total iron. Table II-A shows that these concentrations are much more representative of the average F006 thru F009 concentrations than the 5350 mg/L T-CN and 27.8 mg/LYT-Fe concentrations present in the F011 waste stream used by EPA to demonstrate cyanide non-wastewater BDAT for second third scheduled wastes.

Comment Number: 4-B-1 continued
Docket Number: LD12-00043
Commenter: CyanoKEM
Issue: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: Cyanide Treatment Standards
Comment:

Since CyanoKEM's experience shows that the D003 wastes described in Table II-A and Section III of these comments treat similarly to F006 through F009 electroplating listed wastes, we believe that such wastes must be regulated by the same standards. However, CyanoKEM also agrees with EPA that waste streams that are treatable to the lower cyanide standards for non-wastewaters (i.e., 110 mg/Kg T-CN and 9.1 mg/Kg amenable CN) should be regulated by these lower standards. Some D003 is generated that is truly more appropriately treated to these lower standards.

In order to determine which D003 streams are treatable to the 110 mg/Kg T-CN standard, and which streams result in a higher residual total cyanide in the non-wastewater after treatment, CyanoKEM recommends a simple calculation of non-amenable complex cyanide in the raw waste. This calculation is made by subtracting the concentration of amenable cyanide from the total cyanide in the raw sample. These analyses should be made according to US EPA procedures described in SW846 Method 9010.

If the calculation of "non" amenable complex cyanide is less than the 110 mg/Kg T-CN, the waste is potentially treatable to meet a non-wastewater standard of 110 mg/Kg T-CN. If the "non" amenable complex cyanide is 110 mg/Kg or more, the non-wastewater residue is not treatable to below 110 mg/Kg T-CN by BDAT and therefore should be required to comply only with the 590 mg/kg T-CN non-wastewater standards which has been demonstrated for typical electroplating waste codes and promulgated in the second third land disposal restrictions.

In essence, two treatability groups for D003 wastes should be in effect for complying with the non-wastewater land disposal standards.

1. One treatability group (simple cyanides) would be defined by a non-amenable complex cyanide concentration of less than 110 mg/Kg and would be required to meet the 110 mg/Kg T-CN standard for non-wastewater land disposal.

2. The second treatability group (complex cyanides) would be defined by a non-amenable complex cyanide concentration of greater than 110 mg/Kg and would be required to meet the 590 mg/Kg T-CN standard for non-wastewater land disposal.

Comment Number: 4-B-1 continued
Docket Number: LD12-00043
Commenter: CyanoKEM
Issue: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing Reactive Listing Constituents
Comment: → Cyanide Treatment Standards

The treatability level designation can be established at the point of waste generation, collection, storage, and/or any other point prior to treatment by running EPA approved standard cyanide analyses. It can be applied to such waste streams as D003, F011, F012, F019, and P-coded wastes that may typically be expected to meet the 110 mg/Kg T-CN non-wastewater standard for routine spent waste disposal streams. As a result, this will provide a mechanism for dealing with the remaining, more difficult to treat wastes that also fit into these waste code categories but cannot meet the 110 mg/Kg T-CN standard.

The test proposed above for use in distinguishing simple from complex cyanide is excellent in that it is equivalent to a bench treatability test. It is also found in SW846 and in the APHA Standard Methods for Examination of Water and Wastewater, so that no new methodology will need to be developed by EPA.

CyanoKEM recommends that EPA establish these two treatability groups based on simple and non-amenable complex cyanides for waste codes D003, F019, F011, F012, and the P coded cyanide bearing wastes.

Comment Number: 4-B-1 continued
Docket Number: LD12-00043
Commenter: Cyano KEM
Issue: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing Reactive Listing Constituents
Comment:

TABLE II-A

Comparison of Raw Waste Cyanide and Iron Content on Treated Non-wastewater Cyanide Concentration for D003 vs. Listed Electropating Waste Codes

**Feb. 12 to Mar. 26, 1989
D003 and Electroplating Code
Cyanide Batch Treatments**

EPA Waste Code	Vol.% of Total Batch	Untreated Waste Composition Avg. T-CN mg/Kg	Untreated Waste Composition Avg. T-Fe mg/Kg
F006	4.5	263	12,965
F007	15.9	23,585	613
F008	1.7	16,906	12,535
F009	21.7	32,787	13,019
D003	15.3	49,950	6,692
	Total Vol.%	Volume Weighted Avg. T-CN mg/Kg	Volume Weighted Avg. T-Fe mg/Kg
	59.1%	18,519	4,742
Avg. Treated Filter Cake at 44 Wt.% Solids		T-CN mg/Kg 298	T-Fe mg/Kg 50,000

**Typical July 24 to Oct. 30, 1989 D003
Cyanide Waste Batch Treatments**

	Avg. Vol.% of Total Batch	Waste Stream I.D. Number	Untreated Waste Composition T-CN mg/Kg	Untreated Waste Composition T-Fe mg/Kg	Treated Filter Cake T-CN mg/Kg	Treated Filter Cake CN(A mg/K
	11	4,078	5,455	4,170	438	<1.0
	6	11,036	150,000	1,000	516	<1.0
	36.4	9,505	85,294	1,414	469	<1.0
	6.5	11,415	17,500	36,250	371	<1.0
	26	3,049	10,277	2,530	281	<1.0
	27.3	11,798	20,227	91	436	<1.0
	8.5	11,094	34,821	12,500	342	29.0
	34.5	3,047	10,833	6,250	500	<1.0
	45.5	1,556	12,667	675	529	<1.0
Mean	22.4	---	38,558	7,209	431	<4.0

COMMENT NUMBER: 4-B-1
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

COMMENT NUMBER: 4-B-1 continued
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

The Agency has reviewed the D003-cyanide waste characterization data submitted by the commenter (and several other commenters). The Agency appreciates the submission of these data as they were useful in developing the final treatment standards. The D003-cyanide waste streams averaged about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency also agrees that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-2

Docket Number: LD12-00043

Commenter: CyanoKEM

Issue: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

Subissue: — Cyanide Treatment Standards

Comment:

PLANT AND LABORATORY TREATABILITY TEST DATA

A. Full Scale Plant Operating Data

In CyanoKEM's submittal of data to Docket No. F-89-LD10-FFFFP for proposed regulation 54FR1066 concerning cyanide BDAT for the second third scheduled land disposal restrictions, a series of batch cyanide treatment runs were presented to describe non-wastewater total cyanide treatability. In particular, a series of 13 batch runs were presented in Tables 1 and 2 of a supplemental submittal dated April 20, 1989 to Mr. Jim Berlow, US EPA (ref. Docket LD10) from Richard Schlauch, CyanoKEM (a copy of this document is attached to Appendix C). Table 1 of that document shows the quantity of cyanide filter cake (non-wastewater residue) generated for each of these full scale plant runs and Table 2 shows the resulting cyanide non-wastewater quality in terms of total cyanide concentration. Using this data, EPA developed BDAT standards for land disposal of F006, F007, F008, and F009 non-wastewater residues at 590 mg/Kg T-CN and 30 mg/Kg CN(A). Thus all background information including QA/QC for laboratory analysis has been previously submitted along with this data.

Using the information shown in these tables and reviewing the records of individual waste streams treated during the period of these 13 batch treatment runs (i.e., February 12, 1987 through March 26, 1987) we are submitting a more detailed breakdown of the cyanide and iron analyses of the individual D003 waste streams treated during this period as well as some more recent periods (i.e., July to October 1989). This information is shown here in Table III-A and describes the typical characteristics of most D003 waste streams received for treatment by CyanoKEM. A review of this table shows that most D003 wastes received (i.e., only those manifested under the D003 codes) have substantially more than 1000 mg/Kg of iron as an integral part of the waste.

Comment Number: 4-B-2 continued
Docket Number: LD12-00043
Commenter: Cyano KEM
Issue: D003 Characteristic Reactive Wastes and P and U
Waste Containing Reactive Listing Constituents
Subissue:
Comment: — Cyanide Treatment Standards

Note also that these wastes consist of a diversity of powders, solids, filtered crystalline residues, clear solutions, dry dusts and even suspended solids containing liquids. Therefore, by analysis and physical characteristics they tend to be significantly different and more variable than the F011 dilute wastewater stream tested by EPA to develop the non-wastewater land disposal standards of 110 mg/Kg T-CN and 9.1 mg/Kg CN(A). Because of the different physical properties of these D003 wastes, and the fact that they are more concentrated in total cyanide content, and finally the fact that they contain significant levels of cyanide in the form of non-amenable complex cyanide, the higher standard of 590 PPM is more appropriate.

Table III-B was also developed from the data on the February 12 through March 26, 1987 batch runs to show the relative percentages of D003 wastes contained in each batch and as an average volume percent of cyanide waste treated over this period. Note that an average of 15.3 percent of the cyanide treated was D003 waste with a maximum of 30.1 volume percent during this period.

Thus, by volumes treated, and total cyanide and iron content of raw waste (see also Table II-A) it is very apparent that D003 wastes are substantially of the same treatability characteristics as F006, F007, F008 and F009 waste codes. For example, the iron content which contributes to formation of unoxidizable cyanide complexes, is present in D003 wastes at an average concentration that is 41% higher than the average iron concentration of all combined F006, F007, F008, F009 and D003 waste codes. D003 is also shown to have the highest total cyanide concentration among this group of waste codes. Iron is ubiquitous many in industrial processes, and only a trace amount, 50-100 PPM, is needed to form a non-amenable complex cyanide. We have included in Appendix D, statements by generators of these waste streams attesting to the fact that iron contamination in their waste is unavoidable due to normal process conditions.

Comment Number: 4-B-2 continued
Docket Number: LD12-0.0043
Commenter: Cyano KEM
Issue: D003 Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Const
Comment: Cyanide Treatment Standards

The continued prevalence of these more difficult to treat D003 waste streams is indicated by the waste stream and treatability characteristics shown for more recent D003 receipts (i.e., July 24 to October 30, 1989) in Tables II-A and III-A of the present submittal. In fact, on an average basis, there appears to be an increase in D003 volume from about 15% average to about 22% average of the total cyanide waste treated from 1987 to 1989.

B. Laboratory Bench Test Results on Individual Selected D003 Waste Samples

Two samples of D003 waste were selected from drum waste receipts on hand and laboratory tested to determine the effect of treatment (by alkaline chlorination) on non-wastewater residue (i.e., treated filter cake) total and amenable cyanide concentration. This was done to demonstrate that complex cyanides are not being formed from iron in other admixed wastes or from the process equipment used in treating the waste.

Sample 1. A sample from two 55-gallon drum lots received November 30, 1989 and designated Waste No. 11978 is a yellow liquid giving the following analysis:

T-CN = 2,156 mg/Kg Cu = 75 mg/Kg Ni = 80 mg/Kg
CN(A) = 1,718 mg/Kg Cr = 283 mg/Kg Cd = 800 mg/Kg
CN(non-amenable) = 438 mg/Kg
T-Fe= 349 mg/Kg Pb = 1.0 mg/Kg Zn = 58 mg/Kg

Comment Number: 4-B-2 continued
Docket Number: LD12 - 00043
Commenter: CyanoKEM
Issue: D003 Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituen
Comment: Cyanide Treatment Standards

TABLE III-A

UNTREATED D003 WASTES RECEIVED

DATE TREATED			WASTE DESCRIPTION					
YEAR	MONTH	DAY	EPA CODE	I.D. NO.	VOL. GAL.	PHYSICAL STATE	T-CN mg/Kg	T-Fe mg/Kg
1987	FEB.	12	D003	3937	110	POWDER	111,364	11,000
		16	D003	3575	3135	Filt'd Solid	6,100	7,500
		17	D003	2652	1375	ROCK-LIKE SOLIDS	173,750	2,652
		17	D003	4215	55	DRY SOLID	1,000	10,300
		18	D003	1844	1760	Filt'd SOLID	61,111	47,250
		24	D003	4256	165	NaCN SOLN	83,333	4,256
		25	D003	1556	4578	LIQUID	3,124	910
	MAR.	5	D003	1600	5000	LIQ. W/SS	5,300	1,550
		17	D003	4174	110	LIQUID	79,545	550
		19	D003	4009	55	SOLIDS	<100	4,060
		20	D003	4297	990	DRY DUST	40,000	4,680
		20	D003	1600	5000	LIQUID	3,640	1,240
		23	D003	4466	2255	CLEAR LIQ.	330	<100
		24	D003	4524	55	SOLIDS	82,500	3,530
		24	D003	4528	55	SOLIDS	65,000	3,000
		26	D003	3575	1320	SOLIDS	83,000	4,500
				MEAN	1626		49,950	6,692
1989	JUL.	22	D003	4078	1210	SLUDGE	5,455	4,170
		24	D003	11036	660	LIQUID	150,000	1,000
	AUG.	1	D003	9504	4000	SOLIDS	85,294	1,414
	SEP.	20	D003	11415	715	SOLID	17,500	36,250
		21	D003	3049	2860	CRYST.	10,227	2,530
		26	D003	11794	3000	LIQUID	20,227	91
		29	D003	11094	935	SOLIDS	34,821	12,500
	OCT.	17	D003	3047	3795	CRYST.	10,833	6,750
		30	D003	1556	5000	LIQUID	12,667	675
				MEAN	2463		38,556	7.264

Comment Number: 4-B-2 continued

Docket Number: LD12-00043

Commenter: Cyano KEM

Issue: 003 Characteristic Reactive Wastes and P and U Wast Containing Reactive Listing Constituents

Subissue: Cyanide Treatment Standards

Comment:

TABLE III-B

PERCENT WASTE CODE COMPRISING BATCH RUN AND RESULTING NONWASTEWATER T-CN CONCENTRATION FOR FEB. 12 to MAR. 23, 1987 CYANIDE TREATMENTS

RUN NO.	F006	F007	F008	F009	F011	F012	D002	D003	P029	P030	P106	P121	TREATED FILTERCAKE mg/kg T-CN
1	—	13.3	1.1	16.4	—	17	17.8	15.9	—	11.9	6.6	—	479
2	—	7.7	—	15.4	—	—	21.5	24.6	—	13.6	17.2	—	204
3	16.2	11.9	—	29.3	—	—	1.8	11.6	—	—	29.2	—	471
4	12.5	48.4	3.9	9.2	—	—	—	24	1.1	0.6	0.3	—	501
5	6.1	19.1	—	30.8	4.1	4.6	13.5	11.1	—	0.3	10.4	—	315
6	3.3	17.2	—	16.0	4.2	4.5	27.4	11.9	—	—	10.2	5.3	328
7	3.3	29.5	—	19.1	3.4	—	27.2	12.2	—	—	—	5.4	226
8	5.5	22.5	2.9	16	4.1	29.8	—	13.2	—	—	—	6.0	254
9	8.5	13.7	3.0	16.7	4.2	3.0	31	13.7	—	—	—	6.2	143
10	3.1	5.5	—	50.6	—	4.1	31.8	0.3	3.7	0.9	—	—	192
11	—	5.9	—	54.1	—	0.7	34	0.4	4.0	0.9	—	—	153
12	—	6.2	5.6	4.3	1.6	—	37.2	30.1	—	15	—	—	338
13	—	6.2	5.6	4.3	1.6	—	37.2	30.1	—	15	—	—	273
Mean	4.5%	15.9%	1.7%	21.7%	1.8%	4.9%	21.6%	15.3%	0.7%	4.5%	5.6%	1.8%	298 mg/l

Comment Number: 4-B-2 continued
Docket Number: LD12-00043
Commenter: CyanoKEM
Issue: D003 Characteristic Reactive Wastes and P and
U Wastes Containing Reactive Listing Constitu
Subissue: —Cyanide Treatment Standards
Comment:

A 100 gram sample of W-No. 11978 was placed in a 500 ml beaker with magnetic stirring diluted with 100 ml of water, and treated with slow addition of 15% sodium hypochlorite. Following alkaline chlorination by holding an excess hypochlorite at +400 mv ORP for 1.0 hr, the pH was lowered with acid to 8.0 to 9.0 and mixed for additional 2 hours. The precipitated metals and other suspended solids were vacuum filtered on a Whatman No. 42 filter paper to remove all free liquid. The filter cake residue was then analyzed for cyanide content by procedures consistent with Method 9010 in EPA Laboratory Procedures Manual SW846. The following treatability results were obtained.

Effluent (filtered supernatant) T-CN = 1.25 mg/Kg
Filter Cake (non-wastewater) T-CN = 631 mg/Kg
CN(A) = 30 mg/Kg

Sample 2. A sample from six 55-gallon drum lots received November 30, 1989 and designated Waste No. 12209 is a brownish-grey solid resulting from scale build-up on cyanide solution piping. This sample gives the following analysis:

T-CN = 20,272 mg/Kg Cu = 161 mg/Kg Ni = 137 mg/K
CN(A) =19,554 mg/Kg
CN (non-wastewater) = 781 mg/Kg Cr = 31 mg/Kg Cd = 77 mg/Kg
T-Fe = 1400 mg/Kg
pH = 9.8 Pb = <5 mg/Kg Zn = 16 mg/Kg

A 100 gram sample was ground to powder and placed in a 500 ml beaker with magnetic stirring and slurried with 100 ml of water. Following addition of NaOH to pH 12±0.5, and addition of 15% sodium hypochlorite to an excess hypochlorite measured at +400 mv ORP for 1.0 hour, the pH was lowered with acid to 8.0 to 9.0 and mixed for additional 2.0 hour. The precipitated metals and other suspended solids were vacuum filtered on a Whatman No. 42 filter paper to remove all free liquid. The filter cake residual and filtrate were analyzed for total cyanides by procedures consistent with Method 9010 in EPA Laboratory Procedures Manual SW846. The following treatability results were obtained:

Comment Number: 4-B-2 continued
Docket Number: LD12-00043
Commenter: Cyano KEM
Issue: D003 Characteristic Reactive Wastes and Pond U
Subissue: Waste Containing Reactive Listing Constituent
Comment: — Cyanide Treatment Standards

Effluent (filtered supernatant) T-CN = 2.5 mg/Kg
Filter Cake (non-wastewater) T-CN = 507 mg/Kg
CN(A) = 9.0 mg/Kg

These results indicate that 349 mg/Kg of iron in Sample 1, caused cyanide complexes to form that resulted in 631 mg/Kg T-CN in the non-wastewater solid. Sample 2, with 1400 mg/Kg Fe resulted in 507 mg/Kg T-CN in the non-wastewater residue.

Although there is no obvious proportionality between raw waste T-Fe concentration and non-wastewater T-CN concentration, the tests demonstrate that in both cases, the non-wastewater results, being greater than 110 mg/Kg T-CN, were predicted by the concentrations of non-amenable cyanides calculated from the raw waste total and amenable cyanide concentrations. The differences in non-amenable cyanide concentrations analyzed in raw samples and treated filter cake total cyanides are readily explained as follows:

1. Sample 1, being mostly liquid and dissolved solids, before treatment, results in a total solids concentration increase after dewatering of the insoluble precipitates. Accordingly, this also effects an increase in concentration of insoluble non-ameanble cyanide from raw waste to non-wastewater residue.

2. Sample 2, being essentially an insoluble material before treatment, does not result in a total solids volume decrease from raw waste to dewatered filter cake. Therefore, no increase in non-amenable complex cyanide concentration is observed in the treatment of this non-wastewater residue.

Note: Refer to Appendix E for QA/QC data regarding these laboratory cyanide tests and analyses.

COMMENT NUMBER: 4-B-2
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

COMMENT NUMBER: 4-B-2 continued

DOCKET NUMBER: LD12-00043

COMMENTER: CyanoKEM

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Cyanide Treatment Standard

RESPONSE:

The Agency has reviewed the D003-cyanide waste characterization data submitted by the commenter (and several other commenters). The Agency appreciates the submission of these data as they were useful in developing the final treatment standards. The D003-cyanide waste streams averaged about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency also agrees that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-3
Docket Number: LD12 - 00043
Commenter: Cyano KEM
Issue: D003 Characteristic Reactive Wastes and P and U Wast
Containing Reactive Listing Constituents
Subissue: — Cyanide Treatment Standards
Comment:

TECHNICAL DISCUSSION DEMONSTRATING NON-TRANSFERABILITY OF TREATMENT STANDARDS FROM F011 WASTE STREAMS TO MANY D003 NON-WASTEWATERS

Many D003, as well as most F006, F007, F008, F009, F011, F012 and P030 wastes allow concentrations of total cyanide in non-wastewater residues from treatment at levels higher than the 110 mg/Kg treatment standard promulgated June 8, 1989 for second thirds scheduled land disposal wastes. Due to significantly higher levels of complexed iron cyanide in these waste codes received by CyanoKEM, as compared to the specific F011 and F012 waste streams considered by EPA in developing this standard, the majority of these wastes can't be treated by alkaline chlorination, precipitation, settling and filtration to meet this standard.

In comparing treatment of these wastes with treatment of the electroplating waste codes (F006, F007, F008 and F009) it is shown that they are treated to similar concentrations of total cyanide in the non-wastewater residue since the untreated feed stream characteristics are normally very much the same. Therefore, a treatment standard of 590 mg/Kg T-CN and 30 mg/Kg amenable CN is shown to be appropriate for treating many of the D003 waste streams received at CyanoKEM. For those D003 wastes having 20 mg/Kg or less iron, determined to be in the form of Fe(CN), the standard of 110 mg/Kg T-CN and 9.1 mg/Kg amenable cyanide can be met as described for the highly site specific conditions represented by the "on-site Engineering Study" used by EPA to develop these standards.

A. Results of EPA Treatment Technology Performance and Operation Study

Results for F011 and F012 waste stream treatment, described in the EPA "On-site Engineering Report" September 20, 1988, indicate that iron concentrations as low as 31 mg/L Fe in feed streams to electrolytic oxidation/alkaline chlorination processes can result in non-wastewater residue T-CN concentrations at 110 mg/Kg.

Comment Number: 4-B-3 continued

Docket Number: LD12-00043

Commenter: Cyano KEM

Issue: D003 - Characteristic Reactive Wastes and P and U v
Wastes Containing Reactive Listing Constituents

Subissue:

Comment:

Data Sample Set No. 1 shown in Figure 4-1 and Table 5-1 (Appendix G), of this report, shows that 27.8 mg/L iron complexed with cyanide in the F011 waste (i.e., WGS1) results in solid residue to landfill (i.e., WGS5) containing 99.4 mg/Kg T-CN. The assumption that all 27.8 mg/L iron in the feed stream is complexed, as $Fe(CN)_6$, is supported by the concentration of 127 mg/Kg "non"-amenable cyanide present in the treated waste (i.e., WGS3) as follows:

$$153 \text{ mg/L T-CN} - 26 \text{ mg/L CN(A)} = 127 \text{ mg/L } \underline{\text{non-amenable}} \text{ CN(NA)}$$

$$127 \text{ mg/L CN (as } Fe(CN)_6 \times \frac{Fe}{6CN} = 127 \times \frac{55.8}{156} = 45.4 \text{ mg/L Fe (as } Fe(CN)_6)$$

Since the 45.4 mg/L equivalent Fe concentration to 127 mg/L of non-amenable cyanide, as $Fe(CN)_6$ complex, is greater than the 27.8 mg/L Fe analyzed in the untreated waste (WGS1), it is concluded that all this initial iron was present as complex $Fe(CN)_6$. Therefore, the concentration of iron required to result in 110 mg/Kg T-CN can be calculated as:

$$27.8 \text{ mg/L Fe} \times \frac{110 \text{ mg/L T-CN(Std)}}{99.4 \text{ mg/L T-CN (analyzed)}} = 30.8 \text{ mg/L Fe}$$

Note, the concentration of T-CN that was not actually destroyed by oxidation but was discharged in the effluent (WGS4) at 103 mg/L T-CN. Effective removal of this cyanide would have resulted in more than 99.4 mg/Kg T-CN in the filter cake (WGS5). If this 103 mg/Kg T-CN were removed by chemical reduction and $Fe(CN)_6$ precipitation (during settling/filtration to achieve the 1.9 mg/L T-CN wastewater standard, the filter press cake cyanide concentration would be increased at least 103 mg/Kg - 1.9 = 200.5 mg/Kg T-CN in the filter cake.

Comment Number: 4-B-3 continued
Docket Number: LD12-00043
Commenter: Cyano KEM
Issue: D003 Characteristic - Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: — Cyanide Treatment Standards
Comment:

In fact, since dewatering of wastewater solids would increase insoluble parameter concentrations in the filter cake, the concentration of T-CN in non-wastewater residue would have exceeded 200.5 mg/Kg by the concentration factor equivalent to the feed to cake volume ratio. For the given test run on F011 waste, the concentration factor for cyanide is calculated to be the total cyanide concentration ratio between the filter press feed and the filter press cake (WGS5) as follows:

153 mg/Kg T-CN (WGS3) - 103 mg/Kg T-CN (WGS4)
= 50 mg/Kg T-CN (in feed to filter press)

$$\frac{\text{T-CN in Press Cake}}{\text{T-CN in Press Feed}} = \text{Concentration factor} = \frac{99.4 \text{ mg/Kg T-CN}}{50 \text{ mg/Kg T-CN}} = 2.0\text{ X}$$

Therefore, if this treatment process was operated effectively to achieve 1.9 mg/L T-CN in the treated wastewater to POTW (WGS4), then the resulting concentration of total CN in solids to landfill would be:

103 mg/Kg - 1.9 mg/Kg = 101.1 mg/Kg x 2.0 = 202.2 mg/Kg (addt'l T-CN)
+ 99.4 mg/Kg (exist'g T-CN)
= 301.6 mg/Kg T-CN (in cake)

In order to meet the 1.9 mg/Kg F011 wastewater standard, a non-wastewater T-CN concentration of 300 mg/Kg or more can result using electrolytic oxidation/alkaline chlorination treatment for untreated wastewater streams containing about 30 mg/L or more iron in the non-amenable complex $Fe(CN)_6$ form.

COMMENT NUMBER: 4-B-3
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-3 continued
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency also agrees that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-4
Docket Number: LD12-00043
Commenter: Cyano KEM
Issue: D003 Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: Cyanide Treatment Standards
Comment:

B. Treatability Characteristics of D003 Wastes Received by CyanoKEM

In contrast to EPA's "On-site Engineering Study," most D003 waste streams received at CyanoKEM have in excess of 1000 mg/L Fe in untreated wastes. This is over thirty times the iron concentration used in developing the 110 mg/Kg T-CN treatment standard for F011 and F012 wastes. In the final second thirds rule promulgated June 8, 1989, EPA acknowledges that the higher iron concentrations in electroplating wastes (eg. F006, F007, F008 and F009) require a higher non-wastewater cyanide treatment standard (i.e., 590 mg/Kg T-CN) than the heat treating cyanide salts and wastewaters tested in the F011 and F012 BDAT treatment study. Since many of the D003 wastes received at CyanoKEM have similar iron and cyanide concentrations to the F006 through F009 waste codes received, these wastes cannot be treated to the 110 mg/Kg T-CN non-wastewater standard.

For example, Table 5-1, Sample Set No. 1 in EPA's "On-site Engineering Report," shows the following waste characteristics for the F011 stream used to demonstrate electrolytic oxidation/alkaline chlorination of heat treating cyanide salts and water (WGS1):

Waste Parameter	Concentration (mg/L)
Total Cyanide (T-CN)	5350
Iron (Fe)	27.8

Comparing the waste characteristics for CyanoKEM D003 wastes, shown in Table II-A of these comments, with the F011 waste stream described in "On-site Engineering Report" Sample Set No. 1 (Table 5-1), it is seen that the total cyanide is at least 7 orders of magnitude higher and iron is at least 250 orders of magnitude higher for typical CyanoKEM D003 wastes than for the waste streams used to demonstrate BDAT for F011 waste and develop the 110 mg/Kg non-wastewater treatment standard.

COMMENT NUMBER: 4-B-4
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-4 continued
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency also agrees that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

COMMENT NUMBER: 4-B-5

DOCKET NUMBER: LD12-00155

COMMENTER: American Electroplaters and Surface Finishers Society

ISSUE: D003-Characteristic Reactive Wastes & P&U Wastes Containing Reactive Listing Constituents

SUBISSUE: Cyanide Treatment Standards

COMMENT:

2. PROPOSED REGULATION OF CYANIDE IN D003 WASTES

The agency proposes to regulate D-003 waste based on their similarity to P-030. The agency states that D-003 wastes are mixed cyanide salts, cyanide solutions, and cyanide bearing sludges (other than F-006 we presume). It also states that D-003 wastes are similar to P-030 because they are "reactive" while P-030 are "soluble" (page 48425). The agency goes on to state that "Soluble cyanides are most likely to be reactive because they are dissolved. Reactive cyanides are thus expected to be easily treated by treatment technologies such as alkaline chlorination and wet air oxidation to meet today's proposed treatment standard for total cyanide of 110 mg/Kg and amenable cyanide of 9.1 mg/Kg." We wish to point out to the agency that certain cyanide salts such as potassium ferrocyanide and potassium ferricyanide are highly soluble yet would not be expected to be reactive, a direct contradiction of the agency's premise for the 110/9.1 proposed regulation.

In light of this contradiction we suggest the agency consider at minimum raising the proposed limitations on D-003 Reactive cyanides to the same level as that of F-006.

COMMENT NUMBER:	4-B-5
DOCKET NUMBER:	LD12-00155
COMMENTER:	American Electroplaters and Surface Finishers Society
ISSUE:	D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Cyanide Treatment Standard

RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-5 (continued)
DOCKET NUMBER: LD12-00155
COMMENTER: American Electroplaters and Surface Finishers Society
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-6
Docket Number: LD12-00172
Commenter: HWTC
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Waste Containing Reactive Listing Constituents
Comment: — Cyanide Treatment Standards

D. D003

1. Reactive Cyanide Wastes

EPA inappropriately assumes that all D003 cyanide waste is as treatable as simple cyanide because of the reactive definition. The fact is that many concentrated D003 wastes contain a wide variety of cyanide compounds as well as other constituents that affect the ultimate treatability of the total cyanide. In today's proposed rule, EPA acknowledges that "Reactive Cyanide wastes typically are generated by the electroplating and metal finishing industries, and include mixed cyanide salts, cyanide solutions, and cyanide bearing sludges." In compliance with this definition many waste generators use multiple waste codes such as F006, F007, F008, F009 as well as D003 in identifying these waste streams for shipment, treatment and disposal. As such these waste typically contain sufficient iron content to result in iron cyanide complex formation. This is true even for wastes that are predominantly reactive cyanide and identified only as D003. An example of a D003 waste with these difficult treatability characteristics is a scale, filtered solid deposit or liquid residue from an untreated cyanide process stream.

Comment Number: 4-B-6 (continued)
Docket Number: LD12-00172
Commenter: HWTC
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: - Cyanide Treatment Standards

Since a threshold level of only 50 to 100 ppm of iron is sufficient to result in significant concentrations of non-oxidizable iron cyanide complex, it is clearly possible for a D003 waste stream to be reactive as well as result in treated non-wastewater total cyanide concentrations greater than 110 mg/Kg. Therefore, D003 treatability is not always transferable from standards developed for the low iron containing F011 and F012 wastes developed from dilute F011, F012 wastewaters for the second thirds scheduled land disposal restrictions. Our members feel that many high concentration waste streams that are coded D003 have treatability found to be more appropriately compared to the 590 mg/Kg total CN BDAT non-wastewater standard developed for F006 through F009 waste codes.

In essence, two treatability groups for D003 wastes should be in effect for complying with the non-wastewater land disposal standards.

- One treatability group (simple cyanides) would be defined by a non-amenable complex cyanide concentration of less than 110 mg/Kg and would be required to meet the 110 mg/Kg T-CN standard for non-wastewater land disposal.
- The second treatability group (complex cyanides) would be defined by a non-amenable complex cyanide concentration of greater than 110 mg/Kg and would be required to meet the 590 mg/Kg T-CN standard for non-wastewater land disposal.

Comment Number: 4-B-6 (continued)
Docket Number: LD12-00172
Commenter: HWTC
Issue: D003 – Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing constituents
Comment: – Cyanide treatment standards

The treatability level designation can be established at the point of waste generation, collection, storage, and/or any other point prior to treatment by running EPA approved standard cyanide analyses. It can be applied to such waste streams as D003, F011, F012, F019, and P-coded wastes that may typically be expected to meet the 110 mg/Kg T-CN non- wastewater standard for routine spent waste disposal streams. As a result, this will provide a mechanism for dealing with the remaining, more difficult to treat wastes that also fit into these waste code categories but cannot meet the 110 mg/Kg T-CN standard.

The test proposed above for use in distinguishing simple from complex cyanide is excellent in that it is equivalent to a bench treatability test. It is found in SW846 Method 9010 and in the APHA Standard Methods for Examination of Water and Wastewater, so that no new methodology will need to be developed by EPA.

The HWTC recommends that EPA establish these two treatability groups based on simple and non-amenable complex cyanides for waste codes D003, F019, F011, F012, and the P coded cyanide bearing wastes.

Comment Number: 4-B-6 (Continued)
Docket Number: LD12- 00172
Commenter: HWTC
Issue: D003- Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive listing constituents
Comment: Cyanide treatment standards

In order to determine which D003 streams are treatable to the 110 mg/Kg T-CN standard, and which streams result in a higher residual total cyanide in the non-wastewater after treatment, HWTC recommends a simple calculation of non-amenable complex cyanide in the raw waste. This calculation is made by subtracting the concentration of amenable cyanide from the total cyanide in the raw sample. These analyses should be made according to US EPA procedures described in SW846 Method 9010.

One of our member companies, CyanoKEM, has provided extensive comments and data supporting this recommendation in more detail. The HWTC urges EPA to take this information into consideration.

COMMENT NUMBER: 4-B-6
DOCKET NUMBER: LD12-00172
COMMENTER: HWTC
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-6 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: HWTC
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency also agrees that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

EPA also notes that this comment (and CyanoKEM's, as well as CyanoKEM's Second Third comments) tend to illustrate the potential D003/F006/F009 miscoding potential. EPA has dealt with this potential problem by adopting the same cyanide standard for D003 cyanide wastes as for F006 wastes.

Comment Number: 4-B-7
Docket Number: LD12- 00.189.
Commenter: DuPONT
Issue: D003- Characteristic Reactive Wastes and P and U
Subissue: Wastes containing Reactive listing Constituents.
Comment: Cyanide treatment standards

6. REACTIVE WASTES - REACTIVE CYANIDES

A. THE PROPOSED BDAT STANDARD FOR D003 REACTIVE CYANIDE WASTEWATERS CANNOT BE MET BY ANDRUSSOW PROCESS CYANIDE PLANTS. AND WILL SEVERELY DISRUPT PRODUCTION ACTIVITIES UNLESS SET AT THE CHARACTERISTIC LEVEL

In developing BDAT standards for this category. EPA has proposed to transfer concentration-based treatment standards for total and amenable cyanides from treatment standards developed in the "Second-Third" final rule for P030 nonwastewaters. but no discussion is presented on the development of the wastewater standard. We assume that the standard has the same basis as those for the cyanide-bearing "P" wastewaters developed in the "Second-Third" rule. BDAT in that case was based on the "Metal Finishing Aqueous Liquids" treatability group for which alkaline chlorination was chosen (see 54 Fed. Reg. 1070).

Du Pont did not comment on the "Second-Third" rulemaking directly (we did participate in the development of CMA's comments) on cyanide bearing wastes because we believed that there would be no land ban repercussions for our cyanide producing plants. This is because cyanide bearing wastes entering land-based units are below the characteristic level for reactive cyanides.

The present proposal, which sets BDAT standards below the characteristic level, poses severe compliance problems for both of our cyanide producing plants because cyanide enters land based units (wastewater treatment surface impoundments) above the BDAT standard, but below the level at which the waste is hazardous by characteristic.

Comment Number: 4-B-7 (continued)
Docket Number: LD12-00189
Commenter: DuPont
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes containing reactive listing constituents
Comment:

In developing BDAT for these wastes, Du Pont contends that EPA did not properly consider achievable cyanide reduction levels that have been developed under the Effluent Limitations for the Inorganic Chemical Manufacturing Point Source Category (Andrussow Process). Effluent pretreatment limitations for new HCN manufacturing facilities contained in 40 CFR 415.425 - 426 are based on achievable performance for an alkaline chlorination facility derived from statistical treatment of plant effluent analytical data. These limits for amenable cyanide are 1.7 ppm average for any day or 0.36 ppm average for any month. For total cyanides, the limits are 11 ppm average for any day and 4.0 ppm average for any month.

The basis for these limits may be found in EPA's Document 440/1-82/007, dated June 1982, entitled "Final Development Document for Effluent Limitation Guidelines and Standards for the Inorganic Chemical Manufacturing Point Source Category." The proposed BDAT grab sample limits of 1.9 mg/l for total cyanides and 0.1 mg/l for amenable cyanides are 1-2 orders of magnitude lower than the composited 24-hour average levels which EPA has considered can be achieved by well operated wastewater treatment plants.

As described below, the BDAT standards cannot be met for one plant after alkaline chlorination treatment in tanks, and in another after treatment in a tank and surface impoundment based system. The problem is more sever for the second plant because alkaline chlorination takes place in non-MTR impoundments, so if a BDAT level other than the characteristic level were promulgated, the plant could not comply.

Comment Number: 4-B-7 (continued)
Docket Number: L012- 00189
Commenter: DuPont
Issue: D003 – Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive listing constituents
Comment: —Cyanide treatment standards

B. BACKGROUND

Du Pont has two sodium cyanide plants, one in Memphis, Tennessee and one in Texas City, Texas. The Texas City plant is operated under contract by Sterling Chemicals. Sterling holds the relevant permits for the facility. The NaCN unit's treated effluent discharges into Sterling's common plant effluent system.

C. MEMPHIS PLANT

Eight products are manufactured in six production areas at the Memphis plant. All process wastewater streams containing cyanide are sent to the Trade Waste Treatment Area (TWTA). The principal objective of the TWTA is the oxidation of cyanides into cyanates before discharge to the Memphis municipal sewer system. This reaction is accomplished by adjusting the pH of the stream into a kinetically favorable region (pH 9 - 10) and performing the alkaline chlorination using sodium hypochlorite as the oxidant.

Treatment Process Description -- The TWTA receives a combined wastewater flow of 3000 gallons/minute (gpm). The principal constituents are ammonia, cyanides (mostly free), sulfuric acid, and organics. All of these are present in varying quantities. Many of the source discharges are intermittent, with either high flows or concentrations for short durations.

Concentrated NaCN wastes at 1 - 5% are pumped into one of two tanks to bring the wastes up to a temperature of about 100 degrees Centigrade. At this temperature, the sodium cyanide decomposes to sodium formate liberating ammonia. When the concentration is reduced to about 50 ppm (below the Interim Guidance for Reactive Cyanide characteristic level in Chapter 7, Section 7.3 of SW-846), the material is emptied at 100 gpm and combined with the total combined 3000 gpm wastewater flow to the TWTA.

Comment Number: 4-B-7 (Continued)
Docket Number: LD12-00.189.
Commenter: DuPont
Issue: D003- Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents
Subissue: —
Comment: Cyanide treatment standards

The wastewater pH is adjusted by the controlled addition of caustic to a pH of 8.5 - 11 in an inlet trench. After the pH is adjusted, sodium hypochlorite is added. During operation, the flow is diverted into either of the two "8-hour" ponds managed in a fill-and-draw mode. The pond being drained flows by gravity to the "1-hour" pond that is fitted with baffles to effect a serpentine flow. The discharge from the "1-hour" pond is to the municipal sewer.

Discharge permit limits to the Memphis City sewer are:

	Maximum for Any Day	Maximum for Monthly Average
Free Cyanide (ppm)	2.0	1.0
Total Cyanide (ppm)	8.0	4.0

Trade Waste area performance is monitored by grab samples taken every hour and analyzed by the area operator along with on-line continuous analyzers. Sampling points include the inlet to the "8-hour" pond, the "8-hour" pond being filled, the inlet to the "1-hour" pond, and the outlet to the "1-hour" pond. Additionally a 24-hour composite sampler is installed to monitor the pH, ammonia, oxidizable cyanide, and total cyanide discharged to the city sewer.

Current sample data on the 24-hour composite sampler averages:

- 0.11 ppm for free cyanide -- with the three standard deviation limit at about 0.38 ppm

- 1.2 ppm for total cyanide -- with the three standard deviation limit of 2.8 ppm

Consequently, even daily average cyanide levels from this plant cannot meet the proposed grab-sample BDAT level.

Comment Number: 4-B-7 (continued)
Docket Number: LD12-00189
Commenter: DuPont
Issue: D003 — Characteristic Reactive Wastes and P and U
Subissue: wastes containing reactive listing constituents
Comment: — Cyanide Treatment Standards

D. TEXAS CITY PLANT

The Texas City Sodium Cyanide plant was built in 1988-89, and began operating in mid-1989. The aqueous waste treatment is performed batchwise in above ground steel tanks. The treatment consists of two steps: first, thermal decomposition, and second, chlorination.

Treatment Process Description -- Concentrated NaCN waste (typically 1% NaCN, can be up to 40% NaCN) is pumped into one of several tanks at 10 gpm average. Live steam is injected into the tank to bring the waste up to 100 degrees Centigrade. At this temperature, the sodium cyanide decomposes to sodium formate, liberating ammonia. When the concentration of sodium cyanide has been reduced to 50 - 150 ppm, this material, which is no longer characteristically hazardous, is transferred batchwise into a treatment tank. It is combined with a 40 gpm stream containing approximately 50 ppm of cyanide. This material is chlorinated at high pH (approximately pH 11) using 10% (nominal) sodium hypochlorite. This oxidizes the remaining sodium cyanide to sodium cyanate.

The effluent from the Sodium Cyanide treatment system at Texas City is discharged into the Sterling Chemicals plant effluent system. This consists of trenches and non-MTR surface impoundments. They are not RCRA facilities. The total plant effluent is discharged to the Gulf Coast Waste Disposal Authority, which is an off-site privately owned treatment works. They have biological treatment ponds (non-RCRA).

Comment Number: 4-B-7 (continued)
Docket Number: LD12-00189.
Commenter: Du Pont
Issue: D003 – Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents
Subissue:
Comment: — Cyanide Treatment Standards

The discharge from the sodium cyanide treatment system to the Sterling plant effluent system is unable to meet the 0.1 ppm amenable cyanide and 1.9 ppm total cyanide proposed for wastewater. Data from August to November show a 24-hour average of 5.9 ppm total cyanide, with a three standard deviation limit of 16.8 ppm. Free cyanide averaged 0.21 ppm, with the three standard deviation limit of 0.47 ppm.

As a result, the plant cannot comply with the requirement that BDAT be met for the non-hazardous waste as it enters the Sterling plant land based wastewater treatment system.

As Du Pont has stated throughout these comments, EPA must abandon it's proposal to set BDAT levels below that for the characteristic itself. To do otherwise will cause serious non-compliance problems for our wastewater treatment plants. If EPA were to move ahead with the proposed approach, the BDAT standard would have to be revised upward to meet what is achievable in our plants, a two-year national capacity variance would have to be granted, and provision made to allow variance waste to continue to be sent to non-MTR facilities during the variance period.

COMMENT NUMBER: 4-B-7
DOCKET NUMBER: LD12-00189
COMMENTER: DuPont
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of 0.86 mg/l amenable cyanides for D003-cyanide wastewaters and reserving standards for total cyanides. The amenable cyanide standard is based on data on the treatment of cyanide wastewaters by alkaline chlorination for the Metal Finishing categorical wastewater discharge standards. The extensive amenable cyanide data used for the development of the Metal Finishing standard provides a substantial basis for the treatability of amenable cyanides by alkaline chlorination. Data submitted by the commenter demonstrates the achievability of the standard.

The major waste characteristic affecting treatment of total cyanide from well-operated and designed alkaline chlorination systems is the level of complexed cyanides. Considering the wide variety of possible sources of D003; the variation in data submitted by commenters; the data used for the Agency's categorical standards; and the potential effects of complexed cyanides on achieving total cyanide wastewater standards, EPA is reserving standards for total cyanides. In the interim, the amenable cyanide standard should provide adequate control of reactive cyanides. Based on the information and changes described above, the Agency believes that the treatment standard being promulgated for D003-cyanide wastewaters are more protective of human health and the environment than a treatment standard of deactivation. Facilities generating D003-cyanide waste streams that, after being treated in a well-designed and well-operated system still do not meet the treatment standard, are able to apply for a treatability variance.

Comment Number: 4-B-8

Docket Number: LD12-00194

Commenter: Rohm and Haas

Issue: D003 - Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents

Subissue: — Cyanide Treatment Standards

Comment:

EPA's proposed third-third land disposal restriction rule will have enormous consequences at the many R and H facilities that treat hazardous waste off-site, and especially at R and H's Houston and Bristol plants which generate and treat large volumes of wastewater on-site. Most problematic are EPA's proposed requirements to treat corrosive wastewater to form insoluble salts and to treat wastewaters from hydrogen cyanide and acetone cyanhydrin production to the proposed level of 1.9 mg/l total cyanides and 0.10 mg/l amenable cyanides. These requirements, which stem from EPA's general approach of proposing treatment standards beyond characteristic parameters and from EPA's extreme interpretation of "impermissible dilution", would require R and H to largely revamp the wastewater treatment systems at these two plants -- wastewater treatment systems that were constructed at multi-million dollar expense to comply with stringent NPDES permits.

Comment Number: 4-B-8 (continued)
Docket Number: LD12-00194..
Commenter: Rohm and Haas
Issue: D003 - Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents
Subissue: — Cyanide treatment standards
Comment:

Another major problem is the proposed D003 reactive cyanide wastewater treatment standard. The proposed standard is transferred from reactive wastes that have soluble cyanides. R and H cannot treat its wastewater to these very low levels because we generate a wastewater containing iron complexed cyanides from hydrogen cyanide and acetone cyanhydrin production. Just as EPA has proposed "deactivation" as the treatment standard for "D003 Other Reactives," EPA should adopt "deactivation" as the treatment standard for reactive wastes from hydrogen cyanide and acetone cyanhydrin production.

Comment Number: 4-B-8 (continued)
Docket Number: LD12-00194
Commenter: Rohm and Haas
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: Cyanide treatment standards

2. EPA Should Revise The Treatment Standard To "Deactivation" For D003 Wastewaters Generated From Hydrogen Cyanide And Acetone Cyanhydrin Production.

R and H cannot treat the wastewaters it generates from hydrogen cyanide ("HCN") and acetone cyanhydrin ("ACN") production to the proposed treatment standard for D003 reactive cyanide wastewaters of 1.9 mg/l total cyanides and 0.10 mg/l amenable cyanides. See 54 Fed. Reg. at 48,426. This standard is based on twice-removed data, transferred first from P030 soluble cyanides, which was transferred a second time from F011 waste containing low levels of iron and high levels of simple, soluble cyanides. Id. at 48,425. EPA says that if data is submitted showing that D003 wastes are more similar to F006 wastes containing high concentrations of iron or other complexed cyanides, the Agency will promulgate higher treatment standards at the F006 levels. (The final F006 nonwastewater treatment standards are 590 mg/kg (total) and 30 mg/kg (amenable). The proposed F006 wastewater treatment standards are 1.9 mg/l (total) and 0.10 mg/l (amenable), which is the same as the proposed D003 level for reactive cyanide wastewaters).

Comment Number: 4-B-8 (continued)
Docket Number: LD12- 00194.
Commenter: Rohn and Haas
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: containing reactive listing constituents
Comment: — Cyanide Treatment Standards

R and H produces HCN and ACN and generates from these processes a complex wastewater matrix of cyanide species consisting of complexed cyanides and cyanides amenable to chlorination. The wastestream goes through a steam stripper in which the cyanides are substantially removed. The stream is then beneficially used in treatment of other chemicals and wastestreams. First, the pH is adjusted upward for stripping of ammonia in later trays in the same stripper unit. The alkaline stream is then combined with acid streams to provide beneficial neutralization at the central treatment plant. This use of a wastestream to treat other chemicals and wastestreams avoids having to add virgin agents to the treatment process.

Not only does the wastestream contain high levels of complexed cyanides as it is generated from the production process, but also the percentage of complexed cyanides and iron in this wastewater increases as it moves through the stripper and is beneficially used in the treatment process. As such, our wastestream is not at all like P030 upon which EPA bases the proposed D003 treatment standard. In some respects, our wastestream is like F006 nonwastewater in that it contains high concentrations of iron and complexed cyanide. But our wastestream differs from F006 nonwastewater most notably because it is a wastewater and because it comes from an entirely different process. Indeed, EPA's recommended testing procedures for cyanide wastes do not readily apply to an HCN and ACN process wastewater. *See* Memo from David Freidman, Evaluation of Wastes for Toxic Gas Generation Reactivity (40 C.F.R. 261.23(a)(5)).

Comment Number: 4-B-8 (continued)
Docket Number: LD12-00194
Commenter: Rohn and Haas
Issue: D003: Characteristic Reactive Wastes and Part U
Subissue: Wastes containing reactive listing constituents
Comment: Cyanide treatment standards

As discussed in the next section, EPA has no legal authority to set treatment standards below characteristic levels. Thus, the proposed standards are, on their face, unlawful. Moreover, EPA should not transfer treatment standards from very different wastestreams such as P030, and impose them upon HCN and ACN process wastewater.

Rather, EPA should establish "deactivation" as the treatment method for HCN and ACN process wastewaters. Under such a standard, R and H would continue to treat these wastestreams using Best Available Technology ("BAT") which, in our case, is steam stripping. Application of BAT to this wastestream reduces the cyanide levels by 90% to where they average 100 ppm or less at the stripper outlet. At these levels, the wastewater does not exhibit the reactive characteristic. 3/ Further reductions occur so that at the inlet to our lagoon the cyanide levels are typically below 10 ppm.

3/ EPA relies on 1985 guidance for evaluating wastes for toxic gas generation reactivity. EPA says that if a waste (using methods that are still being developed) has more than total releasable cyanide of 250 mg HCN/Kg waste it is a hazardous waste. See memo from David Friedman, "Evaluation of Wastes for Toxic Gas Generation Reactivity" (undated with attachment dated December, 1987).

Comment Number: 4-B-8 (continued)
Docket Number: LD12-00194
Commenter: Rohn and Haas
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: — Cyanide treatment standards
Comment:

We note that EPA has proposed deactivation for certain reactive wastes, including a catch-all category of "D003 Other Reactives." See 54 Fed. Reg. at 48,419. Like these other wastes subject to the deactivation standard, deactivation is appropriate for HCN and ACN process wastewater because "the hazardous characteristic is based on imminent hazard (e.g., violent reactions and ignition) rather than on other criteria such as levels of hazardous constituents." Id. at 48,420/1. Further, the analytical methods for measuring characteristics of these wastes, including HCN and ACN process wastewater, are not well established. Id.

For all of these reasons, EPA should adopt deactivation as the method of treatment for D003 wastewater from the HCN and ACN production process.

COMMENT NUMBER: 4-B-8

DOCKET NUMBER: LD12-00194

COMMENTER: Rohm and Haas

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Cyanide Treatment Standard

RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-8 (continued)
DOCKET NUMBER: LD12-00194
COMMENTER: Rohm and Haas
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

The Agency is promulgating a treatment standard of 0.86 mg/l amenable cyanides for D003-cyanide wastewaters and reserving standards for total cyanides. The amenable cyanide standard is based on data on the treatment of cyanide wastewaters by alkaline chlorination for the Metal

COMMENT NUMBER: 4-B-8 (continued)
DOCKET NUMBER: LD12-00194
COMMENTER: Rohm and Haas
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

Finishing categorical wastewater discharge standards. The extensive amenable cyanide data used for the development of the Metal Finishing standard provides a substantial basis for the treatability of amenable cyanides by alkaline chlorination. Data submitted by the commenter demonstrates the achievability of the standard.

The major waste characteristic affecting treatment of total cyanide from well-operated and designed alkaline chlorination systems is the level of complexed cyanides. Considering the wide variety of possible sources of D003; the variation in data submitted by commenters; the data for the Agency's categorical standards which is a substantial data base on performance of alkaline chlorination wastewater treatment; and the potential effects of complexed cyanides on alkaline chlorination of total cyanides, EPA is reserving standards for total cyanides. In the interim, the amemable cyanide standard should provide adequate control of reactive cyanides. Based on the information and changes described above, the Agency believes that the treatment standard being promulgated for D003-cyanide wastewaters are more protective of human health and the environment than a treatment standard of deactivation. Facilities generating D003-cyanide waste streams that, after being treated in a well-designed and well-operated system still do not meet the treatment standard, are able to apply for a treatability variance.

Comment Number: 4-B-9
Docket Number: LD12-00242
Commenter: Merck & Co., Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: — Cyanide Treatment Standards
Comment:

D003 - Reactive Cyanide wastes present another difficulty. the proposed treatment standards for total and amenable cyanides is coming from the treatment standards for P030. The treatment methods For these wastes, EPA has suggested direct transfer of the total and amenable cyanide treatment standards of P030. Reactive cyanide wastes (D003) are defined at 40 CFR 261.23(a) as those cyanide bearing wastes that generate toxic gases when exposed to pH conditions between 2 and 12.5 in sufficient quantity to present a danger to human health and the environment. "Sufficient quantity" is further defined by EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 12, 1985. The memo states that wastes generating more than 250 mg HCN/kg waste using "Test Method to Determine Hydrogen Cyanide Released from Wastes: (SW-846, Vol IC, section 7.3.3.3) should be regulated as hazardous waste. Waste streams containing cyanide below the 250 mg HCN/kg threshold no longer meet the characteristic and thus are not hazardous wastes. The establishment of a treatment standard below this threshold is inconsistent with current guidance. We therefore suggest that the treatment standard be established at the characteristic level.

Therefore, due to the vague statutory authority to require treatment to below characteristic levels, the limitations on national capacity, the need to make sure that other wastes, which are a risk to human health and the environment have treatment capacity available to them, and the questionable nature of the treatment standards the Agency has developed, we suggest that the treatment standards for characteristic wastes remain at the characteristic levels until the Agency can determine that treatment to below these characteristic levels is necessary to protect human health and the environment.

COMMENT NUMBER: 4-B-9
DOCKET NUMBER: LD12-00242
COMMENTER: Merck & Co.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

The legal authority for the Agency to set limits below the characteristic is addressed in the preamble to the final rule.

Comment Number: 4-B-10

Docket Number: LD12-00270.

Commenter: ETICAM

Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents

Subissue: — Cyanide Treatment Standards

Comment:

2. (3.A.4.d) Reactive cyanides; page 48425

ETICAM treats liquid and solid cyanide bearing wastes. The cyanide solids are first redissolved for treatment, and depending on the process generating the waste, the resultant solution or suspension may be identical to a liquid stream. Additionally, the treatment level achievable is often equilibrium based, and the end point concentration is not necessarily dependent on the initial concentration.

ETICAM also has investigated wet air oxidation, and found the equipment costs to high to justify an installation; the supplier of wet air oxydation systems also remarked that they haven't sold many systems because of this.

COMMENT NUMBER: 4-B-10

DOCKET NUMBER: LD12-00270

COMMENTER: ETICAM

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Cyanide Treatment Standard

RESPONSE:

ETICAM provides no data supporting their statement that the treatment level achievable is often equilibrium based and provides no indication of what they deem is an appropriate standard.

Comment Number: 4-B-11
Docket Number: LD12-L0007
Commenter: CMA
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: Cyanide Treatment Standards

K. The Agency Has Proposed Treatment Standards for Reactive Cyanide-Containing Wastes (D003) Based on Performance Data for a Waste That Has Highly Treatable Cyanides (F011), Rather Than on Data for Wastes Containing Less Treatable Complex Cyanides (F006). This Approach Is Fundamentally Incorrect for Characteristic Cyanide Wastes.

EPA has proposed BDAT standards for the reactive cyanides subcategory of reactive wastes (D003) based on treatment of an F011 waste containing high levels of simple, soluble cyanides. 54 Fed. Reg. at 48,425. This assumes that D003 that "reactive" cyanides are more similar in treatability characteristics to "soluble" cyanides found in F011 than to the "complexed" cyanides found in F006-F009 wastes.

The distinction that EPA has made between "simple" and "complexed" cyanides is inappropriate. The Agency's analytical procedure for determining total releasable cyanide (section 7.3.3.2, Test Methods for Evaluating Solid Waste, SW-846, Third Edition, November 1986) will measure both complexed and simple cyanides as EPA has defined them in the proposed rule and will not differentiate between them. The EPA method requires adding sulfuric acid to the waste sample to evolve HCN gas. Sulfuric acid addition is the first step in the analytical method for identifying total (simple plus complexed) cyanides (Method 4500-CN C, Standard Methods for the Examination of Water and Wastewater, 17th edition, American Public Health Association, Washington, 1989). Therefore, cyanide-containing D006 wastes may contain both complexed and simple cyanides.

Comment Number: 4-B-11 (continued)
Docket Number: LD12-L0007..
Commenter: CMA
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: — Cyanide Treatment Standards
Comment:

The differences between the treatment standards for the F011 (simple) wastes and the F006-F009 (complexed) wastes are marked: the nonwastewater standards for the former are total cyanide = 110 milligrams per kilogram (mg/kg) and amenable cyanide = 9.1 mg/kg while the corresponding standards for the F006-F009 nonwastewaters are total cyanide = 590 mg/kg and amenable cyanide = 30 mg/kg. If a waste that contains complexed cyanides is determined to be hazardous by the D003 characteristic definition, it will not be treatable to the proposed standard for simple cyanides.

The use of the F011 data as the basis for the proposed standard is based on the Agency's "belief" that most wastes containing reactive cyanides are similar to the F011/F030 wastes. In the preamble to the proposed rule, EPA states that if data are submitted that "clearly indicate that D003 wastes in the Reactive Cyanides subcategory more closely resemble F006 wastes" then it will use the F006 cyanide standards as the basis for the final D003 standards. EPA specifically requests data on D003 reactive cyanide wastes to confirm or refute its assumptions.

Comment Number: 4-B-11 (continued)
Docket Number: LD12-L0007
Commenter: CMA
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —
Comment: Cyanide Treatment Standards

Notwithstanding the Agency's request for data, EPA's approach to setting the BDAT standard for D003 reactive cyanide wastes is founded on flawed premises. A "belief" is not a substitute for characterization and treatment data. This fundamental flaw in reasoning is present for many of the characteristic, "U", and "P" wastes for which the Agency has proposed standards.

By definition, the characteristic, "U", and "P" wastes encompass a wide range of possible waste matrices. Nonwastewaters may be sludges from production and treatment processes, contaminated soils, liquids with high concentrations of organic and inorganic solids, spent catalysts, and virtually any combination of such substances. Wastewaters can include continuous process streams, washwaters from equipment cleaning, runoff water contaminated by spills, ground water, and combinations of these and other aqueous wastes. It is impossible for the Agency, or anyone for that matter, to characterize the matrices and treatability of all of the possible materials that could be classified as characteristic, "U", or "P" wastes. It is probable that there will be wastes that will be harder to treat, and easier to treat, than some other waste within the same classification. Given this technically difficult situation, the Agency should specify

Comment Number: 4-B-11 continued
Docket Number: LD12-10007
Commenter: CMA
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: Cyanide Treatment Standards
Comment:

treatment standards for specific waste characteristics or constituents based on BDAT for the least treatable waste in a particular category. In fact, this technical inability to predict the treatability of all possible wastes that exhibit a particular characteristic is ample technical justification for establishing the standard at the characteristic level rather than setting an arbitrary (it will always be arbitrary) treatment standard based on a waste that is assumed to be representative of all other wastes with a given classification.

EPA should therefore establish the characteristic level as BDAT for reactive cyanide (D003) wastes. If the Agency persists in establishing a treatment standard for such wastes below the characteristic level, the standard should be based on the least treatable cyanide-bearing wastes that it has evaluated, namely the F006-F009 wastes. This same methodology should also apply to the other characteristic "P" and "U" wastes.

COMMENT NUMBER: 4-B-11
DOCKET NUMBER: LD12-L0007
COMMENTER: CMA
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-11 (continued)
DOCKET NUMBER: LD12-L0007
COMMENTER: CMA
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-12
Docket Number: LD12-L0028
Commenter: Cyanamid
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —
Comment: Cyanide Treatment Standards

In the absence of an approved petition, the currently proposed, "third-third" land ban regulations would compel the Cyanamid Fortier plant to cease injection of several major wastewater streams and curtail production on May 8, 1990. The affected streams and their quantities are delineated below.

2. D003a (reactive cyanides) nonwastewaters - The principal source of this 36.5 million gallon per year stream is the acrylonitrile process. Similar to the D002 stream (above) the Agency has not distinguished between "wastewaters" and "nonwastewaters" for the purpose of developing BDAT. Again, a capacity variance is proposed for deepwelled D003a wastewaters, but not for D003a nonwastewaters, which would remain subject to a 5/8/90 ban.

COMMENT NUMBER: 4-B-12

DOCKET NUMBER: LD12-L0028

COMMENTER: Cyanamid

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Cyanide Treatment Standard

RESPONSE:

In response to comments, the Agency has set the standards for D003 nonwastewaters at 590 mg/kg total cyanide and 30 mg/kg amenable cyanide. For wastewaters the standard is 0.86 mg/l amenable cyanide, while the total cyanide standard is reserved. The possibility that the Cyanamid Fortier plant could cease injection and curtail production is not a factor in setting BDAT, but is addressed in the capacity analysis to the extent insufficient capacity exists.

Comment Number: 4-B-13
Docket Number: LD12-L0031
Commenter: Thermal KEM/ CyanoKEM
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —Cyanide Treatment Standards
Comment:

Du Pont Comments on D003 Cyanide Wastes

CyanoKEM has reviewed Du Pont's comments to the Docket (File No. 00189) concerning BDAT for D003 wastewaters. Du Pont comments that the proposed BDAT grab sample limits of 1.9 mg/L total cyanide and 0.1 mg/L amenable cyanide are inachievable for their sodium cyanide manufacturing wastes which typically range from 1 to 5% NaCN in the concentrated streams.

In the two manufacturing plants cited, they indicate that although they utilize BDAT alkaline chlorination for cyanide removal on the combined process wastewaters, they do not meet the proposed standards. Both of these facilities pretreat the concentrated sodium cyanide streams by thermal destruction (i.e., about 100°C) for a period of time to decompose sodium cyanide to sodium formate which liberates ammonia. After thermal destruction (cyanide removed down to about 50 PPM total CN) the wastes are combined with other wastewaters and then treated by alkaline chlorination prior to disposal.

CyanoKEM finds that sodium cyanide is among the most readily treatable cyanides by alkaline chlorination to meet the proposed wastewater BDAT limits of 1.9 mg/L total cyanide and 0.1 mg/L amenable cyanide. We conclude from Du Pont's comments that the reason they are unable to achieve the proposed wastewater cyanide standards is that their overall cyanide treatment process is not as good (i.e., not as effective) as EPA's specified BDAT treatments of either alkaline chlorination or electrolytic oxidation followed by alkaline chlorination. In EPA's BDAT studies, the concentrated cyanide streams were treated directly by alkaline chlorination or by electrolytic oxidation followed by alkaline chlorination. Under properly controlled alkaline chlorination conditions, (high pH and ORP control) the cyanide is oxidized to form cyanate and ammonia generation is minimized. By converting the high concentrations of cyanide into ammonia first, Du Pont is introducing a severe interference to subsequent alkaline chlorination.

~~Comment Number:~~ 4-B - 13 (continued)
~~Docket Number:~~ LD12-L0031.
~~Commenter:~~ Thermal KEM / CyanoKEM
~~Issue:~~ D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
~~Subissue:~~ — Cyanide Treatment Standards
~~Comment:~~

Since the ammonia will be present in greater concentration than cyanide in the thermal destruction process effluent, the hypochlorite added to oxidize the cyanide will be consumed by the ammonia in formation of chloramines. Unless excessive amounts of hypochlorite is added to completely oxidize the chloramines to nitrogen, the formation of chloramines will severly slow down the oxidation of cyanides so that efficient cyanide removal cannot be expected in a practical time period.

Unless Du Pont utilizes some type of ammonia stripping or removal process on the thermal destruction process effluent, we conclude that neither of their treatment systems cited in these comments can be expected to meet the proposed BDAT standards for D003 wastewaters.

Rohm and Haas Comments on D003 Cyanide Wastes

CyanoKEM wishes to point out that Rohm and Haas's comments to the Docket (File No. 00194) are in complete agreement with our previous comments submitted to Docket F89-LD12-FFFFF on December 22, 1989 concerning D003 cyanide wastes. That is, complex cyanide D003 wastes do exist and therefore, the 590 mg/Kg total cyanide treatment standard is appropriate for these wastes. The 110 mg/Kg total cyanide standard for complex cyanide D003 waste is unachievable by BDAT.

COMMENT NUMBER: 4-B-13
DOCKET NUMBER: LD12-L0031
COMMENTER: ThermalKem/CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-13 (continued)
DOCKET NUMBER: LD12-L0031
COMMENTER: ThermalKem/CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

The Agency is promulgating a treatment standard of 0.86 mg/l amenable cyanides for D003-cyanide wastewaters and reserving standards for total cyanides. The amenable cyanide standard is based on data on the treatment of cyanide wastewaters by alkaline chlorination for the Metal

COMMENT NUMBER: 4-B-13 (continued)
DOCKET NUMBER: LD12-L0031
COMMENTER: ThermalKem/CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

Finishing categorical wastewater discharge standards. The extensive amenable cyanide data used for the development of the Metal Finishing standard provides a substantial basis for the treatability of amenable cyanides by alkaline chlorination. Data submitted by the commenter demonstrates the achievability of the standard.

The major waste characteristic affecting treatment of total cyanide from well-operated and designed alkaline chlorination systems is the level of complexed cyanides. Considering the wide variety of possible sources of D003; the variation in data submitted by commenters and that for the Agency's categorical standards; and the potential effects of complexed cyanides, EPA is reserving standards for total cyanides. In the interim, the amemable cyanide standard should provide adequate control of reactive cyanides. Based on the information and changes described above, the Agency believes that the treatment standard being promulgated for D003-cyanide wastewaters are more protective of human health and the environment than a treatment standard of deactivation. Facilities generating D003-cyanide waste streams that, after being treated in a well-designed and well-operated system still do not meet the treatment standard, are able to apply for a treatability variance.

Comment Number: 4-B-14
Docket Number: LD12-00110
Commenter: Thermal Kem / Cyano Kem
Issue: D003 - Characteristic, Reactive Wastes and Part V
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

D003 -

(a) Cyanide Standards

We have provided a comprehensive data package to EPA in a separate report submitted 12/22/89, supporting the fact that many D003 cyanide waste contain complex cyanides not treatable to the 110 PPM non-wastewater standard.

EPA therefore must allow for the 590 PPM standard for D003 cyanide waste containing complex cyanides. In essence two treatability groups are justified for D003 cyanide wastes - simple and complex cyanides - with appropriate treatment standards being 110 PPM and 590 PPM respectively. Our comprehensive separate report on these two treatability groups also provides a test for identifying when complex cyanides are present at levels justifying the 590 PPM BDAT standard. We urge the EPA to utilize this data in allowing a 590 PPM BDAT standard for non-wastewater residuals from the treatment of D003 waste containing complex cyanides.

COMMENT NUMBER:	4-B-14
DOCKET NUMBER:	LD12-00110
COMMENTER:	ThermalKem/CyanoKEM
ISSUE:	D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Cyanide Treatment Standard
RESPONSE:	

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-14 continued
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-15
Docket Number: LD12-00098
Commenter: BP America Inc
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

V. EPA has inappropriately based the treatment standard for reactive cyanide-containing waste (D003) on performance date for a waste that is highly treatable rather than wastes containing complex cyanides which are more difficult to treat.

EPA has proposed BDAT standards for the reactive cyanides subcategory of reactive wastes (D003) based on treatment of an F011 waste containing high levels of simple, soluble cyanides (54 FR 48425). EPA's rationale for doing this is that "reactive" cyanides should be more similar in treatability to "soluble" cyanides found in F011 than to "complex" cyanides found in F006-F009 wastes.

The distinction that EPA has made between "soluble" and "complexed" cyanides is inappropriate, in light of the fact that the analytical procedure for determining total releasable cyanides measures both complexed and soluble cyanides.

By definition, the characteristic wastes encompass the entire possible range of waste matrices. It is probable that there will be wastes within each characteristic category that are harder to treat, or easier to treat, than some other waste that has the same classification. Therefore, it is incumbent on the Agency to specify treatment standards for specific waste characteristics based on BDAT for the least treatable waste in a particular category. If the Agency does establish a treatment standard below the characteristic threshold, it should base the standard on the least treatable cyanide-bearing waste that it has evaluated, which are the F006-F009 wastes.

COMMENT NUMBER: 4-B-15
DOCKET NUMBER: LD12-00098
COMMENTER: BP America Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-15 continued
DOCKET NUMBER: LD12-00098
COMMENTER: BP America Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. The Agency is also aware of the range of characteristics that this group of wastes may exhibit. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-16
Docket Number: LD12-00043
Commenter: CyanoKEM
Issue: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituent
Subissue: — Cyanide Treatment Standards
Comment:

COMMENTS ON APPROPRIATENESS OF PROPOSED D003 AND F019 NON-WASTEWATER CYANIDE STANDARDS IN LAND DISPOSAL RESTRICTIONS FOR THIRD THIRD SCHEDULED WASTES (EPA 40CFR Part 148, 261, 264, 265, 268 and 271

I. STATEMENT OF PROBLEM

EPA inappropriately assumes that all D003 cyanide waste is as treatable as simple cyanide because of the reactive definition. The fact is that many concentrated D003 wastes contain a wide variety of cyanide compounds as well as other constituents that affect the ultimate treatability of the total cyanide. In today's proposed rule, EPA acknowledges that "Reactive Cyanide wastes typically are generated by the electroplating and metal finishing industries, and include mixed cyanide salts, cyanide solutions, and cyanide bearing sludges." In compliance with this definition many waste generators use multiple waste codes such as F006, F007, F008, F009 as well as D003 in identifying these waste streams for shipment, treatment and disposal. As such, these waste typically contain sufficient iron content to result in iron cyanide complex formation. This is true even for wastes that are predominantly reactive cyanide and identified only as D003. An example of a D003 waste with these difficult treatability characteristics is a scale, filtered solid deposit or liquid residue from an untreated cyanide process stream.

Since a threshold level of only 50 to 100 ppm of iron is required to result in significant concentrations of unoxidizable iron cyanide complex, it is clearly possible for a D003 waste stream to be reactive as well as result in treated non-wastewater total cyanide concentrations greater than 110 mg/Kg. Therefore, D003 treatability is not always transferable from standards developed for the low iron containing F011 and F012 wastes developed from dilute F011, F012 waste waters for the second thirds scheduled land disposal restrictions. CyanoKEM receives on a daily basis many small volume high concentration waste streams that are coded D003 with treatability found to be more appropriately compared to the 590 mg/Kg total CN BDAT non-wastewater standard developed for F006 through F009 waste codes.

Comment Number: 4-B- 16 (continued)
Docket Number: LD12-00043
Commenter: CyanoKEM
Issue: Characteristic Reactive Wastes and P and
Subissue: U Wastes Containing Reactive Listing Constitu
Comment: – Cyanide Treatment Standards

As contained in the Docket to the second third land disposal restrictions, CyanoKEM and HWTC expressed concern over EPA's statistical calculation methods used in calculating the treatment standard for F011 and F012 non-wastewater.

Our concern is that EPA deviated from its own statistical method to come up with a treatment standard that understates the variability of the two widely scattered data points derived from the on-site engineering studies.

CyanoKEM provided original comments to this effect to the Docket F-89-LD10-FFFFP and is aware of EPA's response to these comments.

CyanoKEM still has disagreement with this variability factor calculation and is not satisfied with the response by EPA in the second thirds rule. We therefore have included in Appendix A a critique of the statistical method performed for us by Dr. Nathan Siu, Professor of Statistics at the Massachusetts Institute of Technology. As can be seen from his report in Appendix A, the original variability factor of 1.58 is in error and a more appropriate variability factor is 6.0. This would make the treatment standard 418 mg/Kg T-CN.

In addition, CyanoKEM feels that EPA's on-site engineering study did not go far enough in its evaluation of the diversity and complexity in the treatability of all F011 waste streams. The on-site engineering study only evaluated the treatment of a rather dilute wastewater stream prepared from a small sample of fused cyanide salt from pot batch cleaning dissolved in heat treating quench water. CyanoKEM's experience in treating entire spent fused salt pot material (received in the iron pots) is that the waste contains orders of magnitude higher complex cyanide (as iron cyanide) than the sample stream used in EPA's development of the existing 110 mg/Kg non-wastewater treatment standard. We therefore feel that a separate higher level treatment standard is needed for these more complex F011, F012 and other waste streams (ref. CyanoKEM's Treatment Variance Petition for F011, F012 and P030 waste streams to Monica Chatmon-McEaddy, July 3, 1989).

COMMENT NUMBER: 4-B-16
DOCKET NUMBER: LD12-00043
COMMENTER: CyañoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-16 continued
DOCKET NUMBER: LD12-00043
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-17
Docket Number: L010-00031
Commenter: Hazardous Waste Treatment Council
Issue: D003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

II. CYANIDE STANDARDS

A. Cyanide BDAT and D003 Waste

The HWTC urges EPA to technology transfer the cyanide treatment standards and BDAT from the electroplating waste (F007, F008, F009, and F011) to D003 waste that are in the Reactive cyanides subcategory. It is the experience of HWTC members that many cyanide bearing waste, including many electroplating waste, are coded by generators as D003, a level that will no doubt increase if there is a significant disparity between characteristic and listed cyanide treatment levels. In fact, over 40% of all cyanide waste is coded as D003. It is important that all cyanide waste be treated to the BDAT levels demonstrated for metal finishing waste, considering the high acute toxicity and high mobility of cyanide. If numerical standards are not technology transferred from the metal finishing waste, the cyanide land disposal restrictions will be meaningless.

Using the landfill guidance level of 250 ppm free cyanide is simply unacceptable. BDAT was not intended to be a body count but rather a means of preventing short-term and long-term insult to the environment. This level was only intended as a guidance level for landfill worker safety in the event that a cyanide bearing reactive waste inadvertently was mixed with an acidic waste in a landfill cell. The guidance was never promulgated as a characteristic level, like the EP toxicity limits, and therefore should not be used as the treatment standard. A free cyanide of 250 ppm could easily exist in a waste with total cyanide content in excess of 20,000 PPM. This free cyanide is also highly mobile and leachable into the environment. Also, the California list prohibition level is not an appropriate treatment standard. The technology transfer of standards set for F007, F008, F009 and F011 to D003 waste is the best approach since it provides for a uniform degree of treatment for all cyanide bearing waste. A less stringent standard for D003 will encourage less treatment of cyanide waste, since many generators will bypass treatment by coding their waste as D003.

COMMENT NUMBER: 4-B-17
DOCKET NUMBER: LD10-00031
COMMENTER: Hazardous Waste Treatment Council
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-17 (continued)
DOCKET NUMBER: LD10-00031
COMMENTER: Hazardous Waste Treatment Council
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-18
Docket Number: L010-00011
Commenter: ENSCO
Issue: D003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

III. D003 Reactive Wastes.

The establishment of numerical treatment standards by direct transfer of standards for total and amenable cyanides from cyanide wastes from electroplating is the appropriate method of establishing standards for D003 Reactive Cyanides. These standards have already proven attainable for previous restricted cyanide wastes. Establishment of specific treatment standards allows utilization of the best treatment technology available for the specific unique waste stream while guaranteeing successful treatment.

COMMENT NUMBER: 4-B-18
DOCKET NUMBER: LD10-00011
COMMENTER: Ensco
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-18 (continued)
DOCKET NUMBER: LD10-00011
COMMENTER: Ensco
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-19
Docket Number: LD10-00005
Commenter: CyanoKEM
Issue: D003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

Cyanide BDAT and D003 Waste

CyanoKEM urges EPA to technology transfer the cyanide treatment standards and BDAT from the electroplating waste (F007, F008, F009, and F011) to D003 waste that are in the Reactive cyanides subcategory. It is the experience of CyanoKEM that many cyanide bearing waste, including many electroplating waste, are coded by generators as D003. In fact, over 40% of all cyanide waste is coded as D003. It is important that all cyanide waste be treated to the BDAT levels demonstrated for metal finishing waste, considering the high acute toxicity and high mobility of cyanide.

Using the landfill guidance level of 250 PPM free cyanide is not protective enough. This level was only intended as a guidance level for landfill worker safety in the event that a cyanide bearing reactive waste inadvertently was mixed with an acidic waste in a landfill cell. The guidance was never promulgated as a characteristic level, like the EP toxicity limits, and therefore should not be used as the treatment standard. A free cyanide of 250 PPM could easily exist in a waste with total cyanide content in excess of 20,000 PPM. This free cyanide is also highly mobile and leachable into the environment. Also, the California list prohibition level is not an appropriate treatment standard. The technology transfer of standards set for F007, F008, F009 and F011 to D003 waste is the best approach since it provides for a uniform degree of treatment for all cyanide bearing waste. A less stringent standard for D003 will encourage less treatment of cyanide waste, since many generators will bypass treatment by coding their waste as D003.

COMMENT NUMBER: 4-B-19
DOCKET NUMBER: LD10-00005
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

For D003-cyanides nonwastewaters, EPA proposed the transfer of concentration-based treatment standards for total and amenable cyanides from treatment standards promulgated in the Second Third final rule for P030 nonwastewaters. The Agency believed that D003-cyanide wastes were more similar to P030 rather than cyanide-containing F006-F009 wastes for which higher (less stringent) cyanide treatment standards were promulgated in the Second Third final rule. Higher treatment standards were promulgated for F006-F009 wastes because of the presence of high levels of iron or other complexed cyanides which makes these wastes more difficult to treat. D003-cyanide wastes are described as "reactive," and P030 is listed for "soluble" cyanides. Soluble cyanides are most likely to be reactive because they are dissolved. Therefore, D003-cyanide wastes were believed to be more similar to P030. [Note: The treatment standards for P030 were developed based on a transfer of data from the treatment of an F011 waste containing low levels of iron and high levels of simple, soluble cyanides.]

In the proposed rule, the Agency also indicated that if public comments clearly indicated that D003-cyanide wastes are more similar to F006-F009 wastes containing high levels of iron or other complexed cyanides, then the Agency would promulgate the higher F006-F009 treatment standards for D003-cyanide wastes.

The Agency has reviewed the D003-cyanide waste characterization data submitted by several commenters. The D003-cyanide waste streams averaged

COMMENT NUMBER: 4-B-19 (continued)
DOCKET NUMBER: LD10-00005
COMMENTER: CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

about 40,000 to 50,000 mg/kg total cyanide and 7,000 mg/kg total iron. The Agency agrees that these concentrations are more similar to F006-F009 wastes than the 5,350 mg/l total cyanide and 27.8 mg/l iron concentrations present in the F011 waste stream used by EPA to develop treatment standards for P030.

The Agency recognizes that some D003-cyanide wastes may have low levels of iron or other complexed cyanides and would therefore be capable of being treated to the lower cyanide treatment standards. However, the commenters have not specifically identified and demonstrated D003 wastes capable of meeting the lower cyanide treatment standard. The Agency does not believe that the calculation of non-amenable cyanides described by this commenter is sufficient to develop a separate treatability group for D003-cyanide wastes that can be treated to the lower treatment standards. Therefore, the Agency is promulgating treatments standards of 590 mg/kg total cyanide and 30 mg/kg amenable cyanide for all D003-cyanide nonwastewaters.

Comment Number: 4-B-20
Docket Number: LD10-00037
Commenter: Cyanamid
Issue: D003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Cyanide Treatment Standards

With respect to D003 Reactive Cyanide wastes, however, we question the Agency's proposal (54 FR 1071, 1096-7) to establish numerical treatment standards, based on direct transfer of cyanide treatment standards of F007, F008, F009, F011. The proposed numerical limits for these F-listed (metal finishing) wastes are significantly lower than the SW-846 analytical definition for the reactive cyanides, thereby creating an obvious inconsistency. If numerical limits are to be established for D003 reactive cyanides (and sulfides) we suggest that they be set no lower than the levels which define these characteristics, i.e., the point where such wastes become nonhazardous.

COMMENT NUMBER: 4-B-20
DOCKET NUMBER: LD10-00037
COMMENTER: Cyanamid
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

The Agency has chosen a concentration based treatment level for wastes in the D003 Reactive Cyanide Subcategory rather than establish "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for the following reasons: First, unlike the other characteristic wastes, the Agency can identify an indicator compound (i.e., cyanide) that is known to be present in all D003 reactive cyanide wastes and can analyze the indicator compound in wastewater and nonwastewater matrices with EPA-approved SW-846 analytical test methods. (See also section III.A.6.(a) of today's preamble for a further discussion of cyanide treatment standards for other wastes and a clarification of the analytical methodology for compliance with the promulgated standards). Second, EPA believes most D003 cyanide wastes are generated from the same types of processes that generate the F006-F012 and P030 wastes and thus are frequently of the same type, and therefore, present similar risks when land disposed as the listed wastes from the same processes. EPA does not believe that Congress precluded the Agency from establishing the same treatment standards for the D003 wastes that have been established for the listed wastes (assuming, of course, that such standards are consistent with the command of section 3004(m) to reduce toxicity or mobility so that risks to health and the environment are minimized). Finally, the agency suspects that some generators are currently misclassifying F006-F012 and P030 wastes as D003 cyanide wastes. While this is primarily an issue for enforcement, the Agency is concerned that a less stringent standard would discourage proper identification of the F and P cyanide wastes. Finally, as a matter of common sense the Agency

COMMENT NUMBER:	4-B-20 (continued)
DOCKET NUMBER:	LD10-00037
COMMENTER:	Cyanamid
ISSUE:	D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Other Cyanide Issues
RESPONSE:	

sees no basis for treating reactivity and not fully treating cyanide in these wastes. Such treatment would not "minimize threats," as required by Section 3004(m).

The Agency realizes that reactive cyanide wastes treated to meet the promulgated standard may no longer exhibit the characteristic of reactivity (although the determination of reactivity can sometimes be difficult due to the non-quantified standard in 40 CFR section 261.23 (a)(5)). The Agency believes this appropriate. As discussed in preamble section III.D., the Agency sees no legal bar in establishing treatment standards that are below the characteristic level. Doing so is appropriate for these wastes because the reactivity characteristic does not evalute the toxic nature of the wastes, because Congress specifically intended that cyanides be destroyed where possible (see statement of Sen Chaffee, 130 Cong. Rec. S 9178-9 (July 25, 1984)), and because the Agency believes the similarity of most D003 wastes and the F006-F009 wastes warrants the same treatment standards for each in order to satisfy the section 3004 (m) standard. Given these considerations the Agency is not concerned about any possible disruptions of the Subtitle D framework, and believes a treatment standard below the characteristic level is warranted.

The analytical methods that should be used to determine reactive cyanide and associated toxic gas liberation can be found in SW-846 Vol. 1C, Chapter 7 which defines the characteristic and regulation of reactive wastes. Specifically, Section 7.3.3.2 describes the "Test Method to Determine Hydrogen Cyanide Released from Wastes" which outlines the correct procedure of hydrogen cyanide gas liberation from reactive

COMMENT NUMBER: 4-B-20 (continued)
DOCKET NUMBER: LD10-00037
COMMENTER: Cyanamid
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
RESPONSE:

wastes. Method 9010 is the analytical method for quantitatively determining reactive cyanide concentrations. While the regulations currently only contain a narrative description of reactive cyanide wastes,quantitative levels are listed in a guidance memorandum. This EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 25, 1985, states that wastes generating more than 250 mg HCN/kg using the above referenced release method should be regulated as hazardous (see Comment #4-F-4 for the response to the sulfide comment), .

Comment Number: 4-B-21

Docket Number: LD10-00043

Commenter: Merck + Co, Inc.

Issue: D003 - Characteristic Reactive Wastes and Part U

Subissue: Wastes Containing Reactive Listing Constituents

Comment: Cyanide Treatment Standards

D003 reactive cyanide wastes present another difficulty. For these wastes, EPA has suggested direct transfer of the total and amenable cyanide treatment standards of F007, F008, F009, and F011 listed wastes. The proposed treatment standards for wastewaters are 12 mg/kg total cyanides and 1.3 mg/kg amenable cyanides and for non-wastewaters are 110 mg/kg total cyanides and 0.064 mg/kg amenable cyanides. Reactive cyanide wastes (D003) are defined at 40 CFR 261.23(a) as those cyanide bearing wastes that generate toxic gases when exposed to pH conditions between 2 and 12.5 in sufficient quantity to present a danger to human health and the environment. "Sufficient quantity" is further defined by EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 12, 1985. The memo states that wastes generating more than 250 mg HCN/kg waste using "Test Method to Determine Hydrogen Cyanide Released from Wastes" (SW-846, Vol IC, Section 7.3.3.2) should be regulated as hazardous waste. Waste streams containing cyanide below the 250 mg HCN/kg threshold no longer meet the characteristic and thus are not hazardous wastes. The establishment of a treatment standard below this threshold is inconsistent with current guidance. We therefore suggest that the treatment standard be established consistent with the current EPA guidance of 250 mg HCN/kg waste.

COMMENT NUMBER: 4-B-21
DOCKET NUMBER: LD10-00043
COMMENTER: Merck & Co., Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Cyanide Treatment Standard
RESPONSE:

The Agency has chosen a concentration based treatment level for wastes in the D003 Reactive Cyanide Subcategory rather than establish "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for the following reasons: First, unlike the other characteristic wastes, the Agency can identify an indicator compound (i.e., cyanide) that is known to be present in all D003 reactive cyanide wastes and can analyze the indicator compound in wastewater and nonwastewater matrices with EPA-approved SW-846 analytical test methods. (See also section III.A.6.(a) of today's preamble for a further discussion of cyanide treatment standards for other wastes and a clarification of the analytical methodology for compliance with the promulgated standards). Second, EPA believes most D003 cyanide wastes are generated from the same types of processes that generate the F006-F012 and P030 wastes and thus are frequently of the same type, and therefore, present similar risks when land disposed as the listed wastes from the same processes. EPA does not believe that Congress precluded the Agency from establishing the same treatment standards for the D003 wastes that have been established for the listed wastes (assuming, of course, that such standards are consistent with the command of section 3004(m) to reduce toxicity or mobility so that risks to health and the environment are minimized). Finally, the agency suspects that some generators are currently misclassifying F006-F012 and P030 wastes as D003 cyanide wastes. While this is primarily an issue for enforcement, the Agency is concerned that a less stringent standard would discourage proper identification of the F and P cyanide wastes.

COMMENT NUMBER: 4-B-21 (continued)

DOCKET NUMBER: LD10-00043

COMMENTER: Merck & Co., Inc.

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Other Cyanide Issues

RESPONSE:

The Agency realizes that reactive cyanide wastes treated to meet the promulgated standard may no longer exhibit the characteristic of reactivity (although the determination of reactivity can sometimes be difficult due to the non-quantified standard in 40 CFR section 261.23 (a)(5)). The Agency believes this appropriate. As discussed in preamble section III.C., the Agency sees no legal bar in establishing treatment standards that are below the characteristic level. Doing so is appropriate for these wastes because the reactivity characteristic does not evalute the toxic nature of the wastes, because Congress specifically intended that cyanides be destroyed where possible (see statement of Sen Chaffee, 130 Cong. Rec. S 9178-9 (July 25, 1984)), and because the Agency believes the similarity of most D003 wastes and the F006-F009 wastes warrants the same treatment standards for each in order to satisfy the section 3004 (m) standard. EPA further believes that the standard adopted today is warranted for these reasons, not withstanding some potential disruption of subtitle D facilities.

The analytical methods that should be used to determine reactive cyanide and associated toxic gas liberation can be found in SW-846 Vol. 1C, Chapter 7 which defines the characteristic and regulation of reactive wastes. Specifically, Section 7.3.3.2 describes the "Test Method to Determine Hydrogen Cyanide Released from Wastes" which outlines the correct procedure of hydrogen cyanide gas liberation from reactive wastes. Method 9010 is the analytical method for quantitatively determining reactive cyanide concentrations. While the regulations currently only contain a narrative description of reactive cyanide wastes,

COMMENT NUMBER: 4-B-21 (continued)

DOCKET NUMBER: LD10-00043

COMMENTER: Merck & Co., Inc.

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Other Cyanide Issues

RESPONSE:

quantitative levels are listed in a guidance memorandum. This EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 25, 1985, states that wastes generating more than 250 mg HCN/kg using the above referenced release method should be regulated as hazardous (see Comment #4-F-4 for the response to the sulfide comment).

COMMENT NUMBER:	4-C -1
DOCKET NUMBER:	LD12-00155
COMMENTER:	American Electroplaters and Surface Finishers Society
ISSUE:	D003-Characteristic Reactive Wastes & P&U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Other Cyanide Issues
COMMENT:	

Furthermore, it is our experience that cyanide containing D-003 wastes generated by the metal finishing industry are usually things such as wooden platforms, rags, and other contaminated objects that don't readily lend themselves to the proposed treatment technologies. Further study of these types of wastes and the appropriate treatment is warranted.

COMMENT NUMBER: 4-C-1

DOCKET NUMBER: LD12-00155

COMMENTER: American Electroplaters and Surface Finishers Society

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Other Cyanide Issues

RESPONSE:

EPA disagrees with the commenter because the wastes mentioned by the commenter are organic debris. These wastes can be incinerated, in which case the cyanide will be destroyed. If, however, wastewater residuals (e.g., quench water, scrubber water) do not achieve the wastewater standard for D003 cyanides, they would have to be treated to the standard using the proposed technologies. Likewise, any nonwastewater residuals (e.g., ash, scrubber water treatment precipitate) that do not achieve the nonwastewater standard for D003 cyanides can be treated to the standard using the proposed technologies.

COMMENT NUMBER: 4-C-2
DOCKET NUMBER: LD12-00160
COMMENTER: American Iron and Steel Institute
ISSUE: D003 - Characteristic Reactive Wastes & P & U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
COMMENT:

Reactive Wastes

AISI is particularly concerned with the Agency's proposal to set specific quantitative treatment standards for wastes classified as D003 Reactive Cyanide wastes and to establish a required method of treatment, "Alkaline Chlorination, Chemical Oxidation, or Incineration Followed by Precipitation to Insoluble Sulfates" for D003 Reactive Sulfides wastes. Both of these wastes are defined only by a narrative description in 40 CFR Section 261.23(a)(5), and there is no quantitative threshold for toxic gases generated from reactive cyanides or sulfides. AISI is aware that the Agency has attempted to develop such quantitative thresholds. See, e.g., 54 Fed. Reg. at 48425. In fact, steel industry representatives have worked with EPA on the Toxic Gas Generation Reactivity Method Discussion Group attempting to develop such quantitative regulations. Nonetheless, promulgation of a test method is not even referenced in the current Regulatory Agenda.

Until quantitative thresholds are defined, it is not possible to identify wastes which might be classified as D003 Reactive Wastes for reactive cyanides or sulfides. In view of this uncertainty, AISI believes it would be improper to set a limit on total cyanide concentration in a waste or to specify a method of treatment for sulfides when such limitations or methods may be totally inappropriate, considering the physical and chemical nature of the wastes involved.

For other wastes in the categories D001, D002, and D003, EPA recognizes that:

> Within each of these subcategories there appears to be a further variety of different waste groups, each with a certain degree of uniqueness with respect to hazard and handling requirements.

See 54 Fed. Reg., at 48419. EPA further concluded that for these wastes "deactivation" was the appropriate method of treatment. AISI believes that uniqueness and concern for safe handling are equally important for the D003 cyanide and sulfide wastes. Designating "deactivation" as the method of treatment would provide the needed flexibility to select treatment technology for these wastes, while assuring safe handling procedures for the wastes. AISI, therefore, recommends that for these D003 cyanide and sulfide wastes the standard be "deactivation as a method of treatment."

COMMENT NUMBER: 4-C-2
DOCKET NUMBER: LD12-00160
COMMENTER: American Iron and Steel Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
RESPONSE:

The Agency has chosen a concentration based treatment level for wastes in the D003 Reactive Cyanide Subcategory rather than establish "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for the following reasons: First, unlike the other characteristic wastes, the Agency can identify an indicator compound (i.e., cyanide) that is known to be present in all D003 reactive cyanide wastes and can analyze the indicator compound in wastewater and nonwastewater matrices with EPA-approved SW-846 analytical test methods. (See also section III.A.6.(a) of today's preamble for a further discussion of cyanide treatment standards for other wastes and a clarification of the analytical methodology for compliance with the promulgated standards). Second, EPA believes most D003 cyanide wastes are generated from the same types of processes that generate the F006-F012 and P030 wastes and thus are frequently of the same type, and therefore, present similar risks when land disposed as the listed wastes from the same processes. Finally, the agency suspects that some generators are currently misclassifying F006-F012 and P030 wastes as D003 cyanide wastes. While this is primarily an issue for enforcement, the Agency is concerned that a less stringent standard would discourage proper identification of the F and P cyanide wastes.

The Agency realizes that reactive cyanide wastes treated to meet the promulgated numerical standard may no longer exhibit the characteristic of reactivity (although the determination of reactivity can sometimes be

COMMENT NUMBER: 4-C-2 (continued)
DOCKET NUMBER: LD12-00160
COMMENTER: American Iron and Steel Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
RESPONSE:

difficult due to the non-quantified standard in 40 CFR section 261.23 (a)(5)). The Agency believes this appropriate. As discussed in preamble section III.C., the Agency sees no legal bar in establishing treatment standards that are below the characteristic level. Doing so is appropriate for these wastes because the reactivity characteristic does not evalute the toxic nature of the wastes, because Congress specifically intended that cyanides be destroyed where possible (see statement of Sen Chaffee, 130 Cong. Rec. S 9178-9 (July 25, 1984)), and because the Agency believes the similarity of most D003 wastes and the F006-F009 wastes warrants the same treatment standards for each in order to satisfy the section 3004 (m) standard.

The analytical methods that should be used to determine reactive cyanide and associated toxic gas liberation can be found in SW-846 Vol. 1C, Chapter 7 which defines the characteristic and regulation of reactive wastes. Specifically, Section 7.3.3.2 describes the "Test Method to Determine Hydrogen Cyanide Released from Wastes" which outlines the correct procedure of hydrogen cyanide gas liberation from reactive wastes. Method 9010 is the analytical method for quantitatively determining reactive cyanide concentrations. While the regulations currently only contain a narrative description of reactive cyanide wastes, quantitative levels are listed in a guidance memorandum. This EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 25, 1985, states that wastes generating more than

COMMENT NUMBER: 4-C-2 (continued)
DOCKET NUMBER: LD12-00160
COMMENTER: American Iron and Steel Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
RESPONSE:

250 mg HCN/kg using the above referenced release method should be regulated as hazardous (see Comment #4-F-4 for the response to the sulfide comment). EPA, however, is not in this proceeding determining which cyanide-bearing wastes are reactive, put another way, no Section 3001 issues are being resolved in this rulemaking.

The Agency acknowledges and appreciates the commenter's help and participation on the Toxic Gas Generation Reactivity Method Discussion Group.

Comment Number: 4-C-3
Docket Number: LD12- 00229
Commenter: F.W. DeVries
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: — Other Cyanide Issues

3. Classification of Cyaniferous Wastes as Hazardous Under the "Reactivity" Criterion

Although not specifically reviewed in this document, it has frequently been brought to the Agency's attention that the draft protocol currently in use by the Agency contains a gross error in suggesting a 10 ppm level of HCN in air as constituting "Acute, Immediate Danger." since this is equivalent to the MSHA occupational exposure limit for 8 hours/day, 40 hours/week exposure. The test procedure to produce this 10 ppm shows it necessary for the waste in question to contain 250 mg/liter of the subject species of cyanide.

The minimum published Immediate Danger Level is 60 ppm HCN in air, with some authorities suggesting values int he 100 to 300 ppm range. If a linear relationship exists between cyanide concentration and the subject solid exposure concentration, the minimum CN content to classify as reactively hazardous would be 1500 mg/liter. This, as noted before, leaves unanswered the question of why the California list limit of 1000 ppm free cyanide needs to be superseded at this time, to protect the environment.

COMMENT NUMBER: 4-C-3
DOCKET NUMBER: LD12-00229
COMMENTER: F.W. DeVries
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
RESPONSE:

The commenter questions the level at which D003 cyanide containing wastes should be considered reactive, and he suggests specific levels. While the regulations currently only contain a narrative description of reactive cyanide wastes, EPA has recommended quantitative levels which are listed in a guidance memorandum. This EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 25, 1985, states that wastes generating more than 250 mg HCN/kg using the method referenced in SW-846 Vol 1C, Chapter 7, 7.3.3.2 should be regulated as hazardous. EPA is not resolving any Section 3001 issues in this rule, nor interpreting the status of guidance documents.

Comment Number: 4-C-4

Docket Number: LD12-00172

Commenter: HWTC

Issue: D003 - Characteristic Reactive Wastes and P and U Wastes containing Reactive listing constituents

Subissue: - Other Cyanide Issues

Comment:

EPA also must codify the test for reactive cyanide in order to better define when a waste is a reactive cyanide. There is currently no concentration standard that defines the level of reactive cyanide in a waste above which it would be considered to exhibit the characteristic of reactivity. This is left only to guidance. The promulgation of the final land disposal restrictions for these wastes makes this a crucial issue. Otherwise, a large loophole will exist for generators of D003 to avoid land disposal restrictions and BDAT treatment.

COMMENT NUMBER: 4-C-4

DOCKET NUMBER: LD12-00172

COMMENTER: Hazardous Waste Treatment Council

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Other Cyanide Issues

RESPONSE:

EPA agrees with the commenter that reactive cyanide wastes need to be better defined and may do so in the future. Currently, the analytical methods that should be used to determine reactive cyanide and associated toxic gas liberation can be found in SW-846 Vol. 1C, Chapter 7 which defines the characteristic and regulation of reactive wastes. Specifically, Section 7.3.3.2 describes the "Test Method to Determine Hydrogen Cyanide Released from Wastes" which outlines the correct procedure of hydrogen cyanide gas liberation from reactive wastes. Method 9010 is the analytical method for quantitatively determining reactive cyanide concentrations. As the commenter points out the regulations currently only contain a narrative description of reactive cyanide wastes. However, quantitative levels are listed in a guidance memorandum. This EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 25, 1985, states that wastes generating more than 250 mg HCN/kg using the above referenced release method should be regulated as hazardous.

Comment Number: 4-C-5
Docket Number: L010-00033
Commenter: American Iron and Steel Institute
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Other Cyanide Issues

D003 Reactive Wastes - Cyanides and Sulfides. As pointed out in the regulatory proposal, D003 wastes in the reactive cyanide subcategory and in the reactive sulfides subcategory are defined as those wastes that generate toxic gases (assumed to be HCN or H_2S) when exposed to pH conditions between 2 and 12.5 in a sufficient quantity to present a danger to human health in the environment. The proposal points out "the agency has not approved a standard analytical method for testing either sulfides or reactive sulfides in hazardous wastes or in treatment residues." Nor has the agency approved a standard method for testing cyanide-containing materials to determine whether they release gases and "a sufficient quantity to present a danger to human health in the environment." Until these standard analytical methods have been defined, neither EPA nor industry can identify all of the wastes which may, at some time, be considered hazardous wastes under this subcategory. Until the agency develops these standard test methods, AISI recommends that the agency maintain the maximum flexibility in any regulations which may apply to this subcategory.

COMMENT NUMBER: 4-C-5
DOCKET NUMBER: LD10-00033
COMMENTER: American Iron and Steel Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Other Cyanide Issues
RESPONSE:

EPA agrees with the commenter that reactive cyanide wastes need to be better defined and may do so in the future. The Agency is not doing so in this proceeding. We summarize existing Agency guidance below:

Currently, the analytical methods that should be used to determine reactive cyanide and associated toxic gas liberation can be found in SW-846 Vol. 1C, Chapter 7 which defines the characteristic and regulation of reactive wastes. Specifically, Section 7.3.3.2 describes the "Test Method to Determine Hydrogen Cyanide Released from Wastes" which outlines the correct procedure of hydrogen cyanide gas liberation from reactive wastes. Method 9010 is the analytical method for quantitatively determining reactive cyanide concentrations. While the regulations currently only contain a narrative description of reactive cyanide wastes, quantitative levels are listed in a guidance memorandum. This EPA Internal Memorandum "Interim Agency Thresholds for Toxic Gas Generation" dated July 25, 1985, states that wastes generating more than 250 mg HCN/kg using the above referenced release method should be regulated as hazardous (see Comment #4-F-4 for the response to the sulfide comment), .

COMMENT NUMBER: 4-D-1
DOCKET NUMBER: LD12-00062.
COMMENTER: ITEX COMPANIES
ISSUE: D003 - Characteristic Reactive Wastes & P&U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Alternatives
COMMENT:

The treatment standard that was proposed for the Reactive Sulfides subcategory of Reactive Characteristic Hazardous Wastes was "Alkaline Chlorination, Chemical Oxidation, or Incineration Followed by Precipitation to Insoluble Sulfates". The discussion on this subcategory (54 FR 48425) included the statement that "reactive sulfides may be treated and chemically converted to relatively inert sulfur, to insoluble metallic sulfide salts, or to soluble sulfates"; however, none of these methods were proposed as any part of a treatment standard methodology. The discussion also indicated that some of these wastes may be contaminated with organic sulfides which are believed to complicate treatment in the petroleum refining industry and pulp and paper industry. ITEX Companies believes that we are successfully treating reactive sulfides in refinery waste in a manner that renders them nonreactive by the precipitation of insoluble metallic sulfide salts in a long term, stable, buffered environment. The following information has been assembled for your consideration in adding sulfide precipitation as a part of the treatment standard or to utilize a concentration based treatment standard that allows any form of successful (and essentially irreversible) treatment.

To provide a specific example with all applicable data, we prepared an experiment in our ITEX laboratory. A sample of oily sludge from a skimmer type unit at a refinery that uses a high percentage of imported sulfur-containing crude was analyzed for reactive sulfides and for total Skinner List constituents in order to fully characterize the sample. The sample released an extremely high concentration of hydrogen sulfide gas (approximately 2750 ppm) and contained relatively high concentrations of typical refinery constituents: lead, chromium, anthracene, naphthalene and pyrene. The sample results and an explanation of the method used to arrive at the reactive sulfide concentration can be found in EXHIBIT A. Also laboratory QA/QC data can be found in EXHIBIT B.

The sample was then subjected to ARCHON$_{TM}$ treatment (an ITEX developed stabilization/solidification process) with the following proportions: 79.6% sample, 5.3% H_2O, and 15.2% ARCHON$_{TM}$ additives. The treated sample was allowed to cure for seven days to approximate long term conditions. A four gram sample of the solidified material was slurried in 100 milliliters of deionized water. A titration from a pH of approximately 12 to 2, with 1.00 N sulfuric acid, was then conducted on the slurried sample using a standard laboratory setup. A 15 minute time period was allowed for equilibrium conditions to be reached between acid additions. The titration was repeated with a modified apparatus (shown in Figure 1) so that evolution of hydrogen sulfide gas (H_2S) could be measured simultaneously. No H_2S was detected throughout the entire pH range. The titration curves are plotted in Figure 2. The curves exemplify the reproducibility of the data and the high buffer capacity of the treated mixture.

COMMENT NUMBER: 4-D-1 continued
DOCKET NUMBER: LD12-00062
COMMENTER: ITEX COMPANIES
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

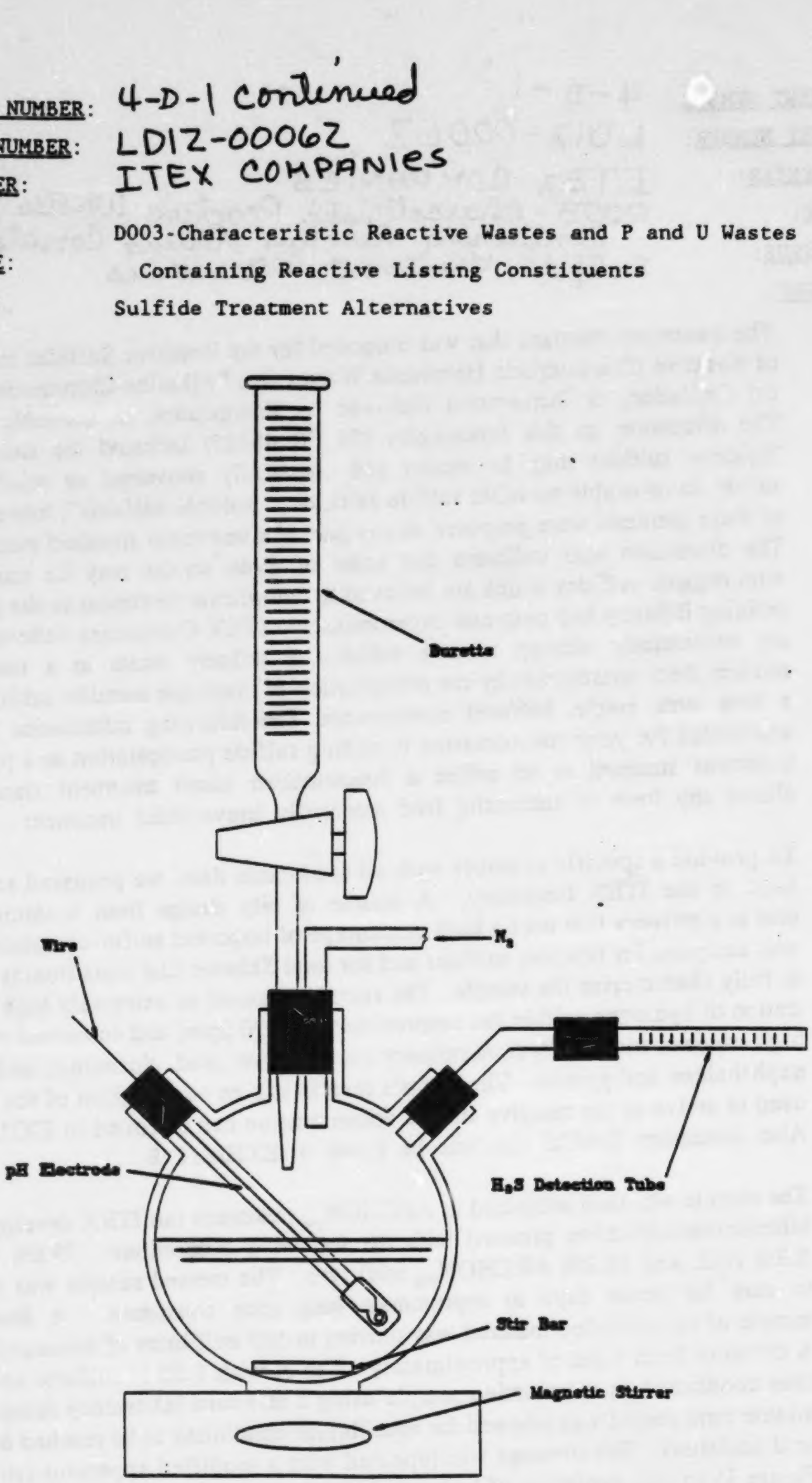

Burette
N_2
Wire
pH Electrode
H_2S Detection Tube
Stir Bar
Magnetic Stirrer

Figure 1. Apparatus to Perform Titration and Determine Hydrogen Sulfide Released from Wastes

3¹

COMMENT NUMBER: 4-D-1 continued

DOCKET NUMBER: LD12-00062

COMMENTER: ITEX COMPANIES

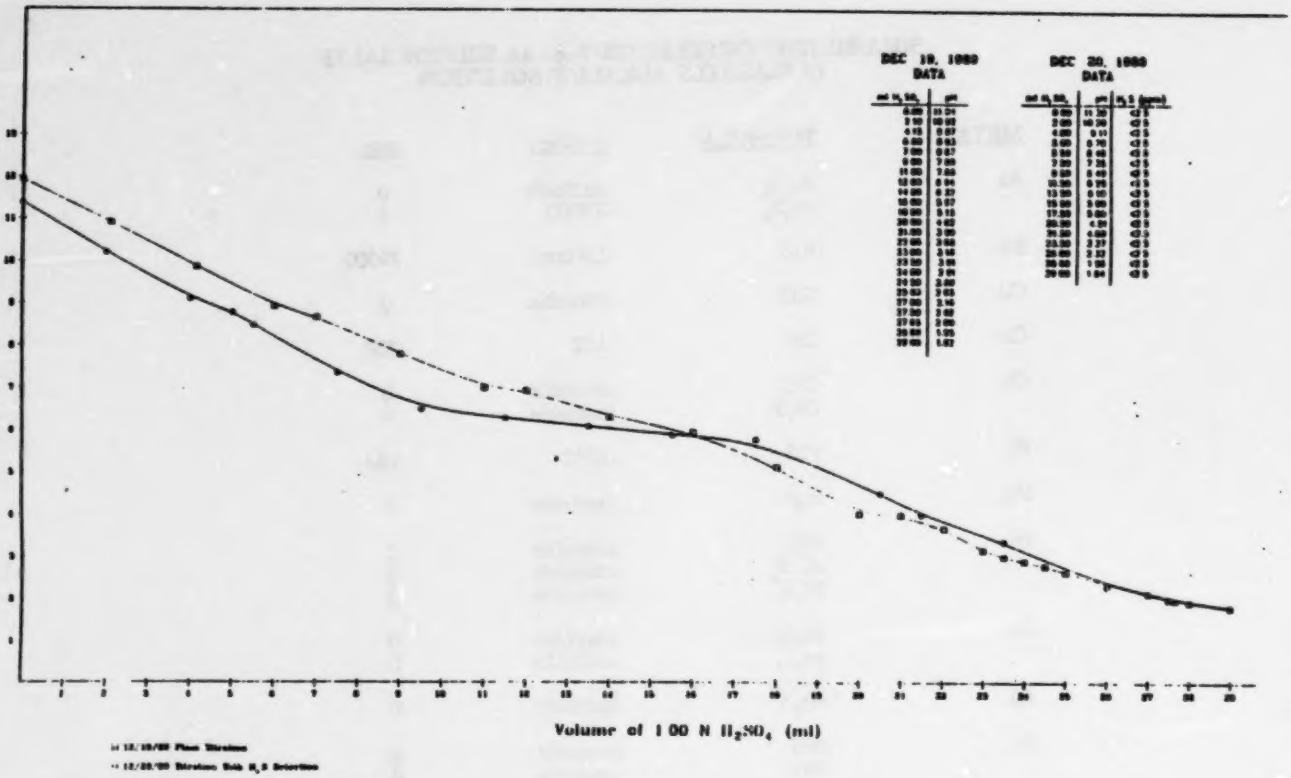
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Sulfide Treatment Alternatives

TITRATION CURVE FOR ARCHON™ TREATED REFINERY SLUDGE SAMPLE WITH H_2SO_4

(Figure 2)



We have seen this treatment method consistently reduce the level of reactive sulfides in a waste from a wide range of concentrations down to nondetectible levels. TABLE 1 contains a list of sulfide salts and their respective solubilities. This data shows that the entire spectrum of metals commonly present in refinery waste and added with the ARCHON$_{TM}$ mix, with the exception of barium, form relatively insoluble sulfide salts in an alkaline solution. This fact would indicate that there will generally be sufficient metals for a group of such reactions to occur in this type waste.

4 1

COMMENT NUMBER: 4-D-1 continued

DOCKET NUMBER: ~~ITEX~~ LD12-00062

COMMENTER: ITEX COMPANIES

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Sulfide Treatment Alternatives

TABLE 1

SOLUBILITIES OF SELECTED METAL SULFIDE SALTS IN SLIGHTLY ALKALINE SOLUTION

METAL	FORMULA	g/100ml	ppm
As	As_2S_3	insoluble	0
	As_2S_5	0.0003	3
Ba	BaS	7.9(dec)	79000
Cd	CdS	insoluble	0
Ca	CaS	0.02	200
Cu	CuS	insoluble	0
	Cu_2S	insoluble	0
Pb	PbS	0.012	120
Hg	HgS	insoluble	0
Ni	NiS	insoluble	0
	NI_3S_2	insoluble	0
	Ni_3S_4	insoluble	0
Se	Se_2S_6	insoluble	0
	Se_4S_4	insoluble	0
Ag	Ag_2S	insoluble	0
Sn	SnS	insoluble	0
	SnS_2	insoluble	0
Zn	ZnS	insoluble	0

Data from Dean, J.A., ed., "Lange's Handbook of Chemistry", 13th ed., 1985, McGraw-Hill

COMMENT NUMBER: 4-D-1 continued
DOCKET NUMBER: LDR-00062
COMMENTER: ITEX COMPANIES
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

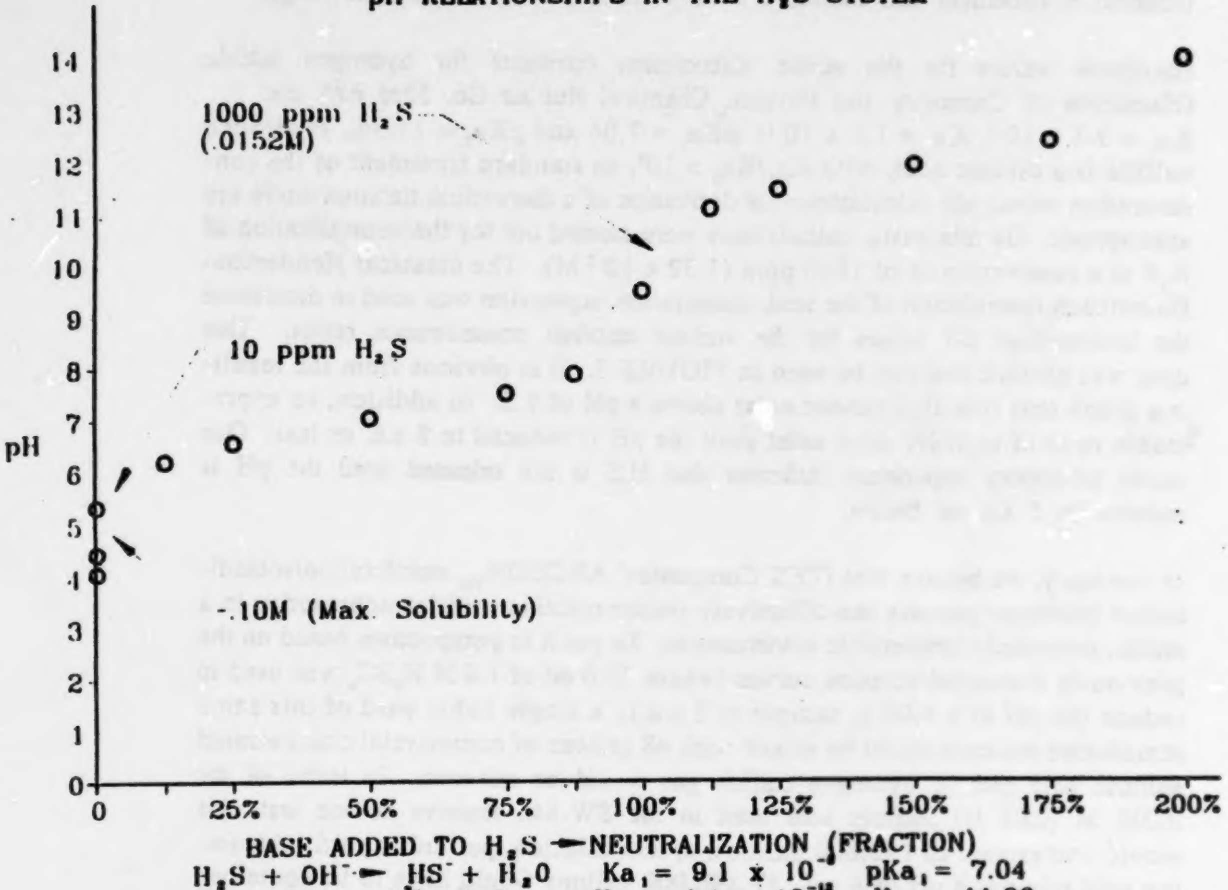
Our research has also shown that stabilization of the reactive sulfides appears to be primarily pH related. Even if all sulfides do not react to form precipitates, they will not be released at the standard pH of the ARCHON$_{TM}$ mix: 10 - 12 standard units. The ARCHON$_{TM}$ process uses a proprietary mixture of additives which results in an excess of carbonate and hydroxide ions providing a strongly buffered environment and therefore a very stable pH in the alkaline range.

Handbook values for the acidic dissociation constants for hydrogen sulfide (Handbook of Chemistry and Physics, Chemical Rubber Co. 53rd ed.) are: $Ka_1 = 9.1 \times 10^{-8}$, $Ka_2 = 1.1 \times 10^{-12}$, $pKa_1 = 7.04$ and $pKa_2 = 11.96$. Hydrogen sulfide is a dibasic acid, with $Ka_1/Ka_2 > 10^4$, so standard treatment of the concentration versus pH calculations for derivation of a theoretical titration curve are appropriate. On this basis, calculations were carried out for the neutralization of H_2S at a concentration of 1000 ppm (1.52×10^{-2} M). The classical Henderson-Hasselbach formulation of the acid dissociation expression was used to determine the intermediate pH values for the various acid/salt concentration ratios. This data was plotted and can be seen in FIGURE 3. It is obvious from the resulting graph that free H_2S cannot exist above a pH of 9.5. In addition, an appreciable ratio of H_2S/SH^- does exist until the pH is reduced to 8 s.u. or less. Our actual laboratory experience indicates that H_2S is not released until the pH is reduced to 5 s.u. or below.

In summary, we believe that ITEX Companies' ARCHON$_{TM}$ stabilization/solidification treatment process can effectively render reactive sulfides nonreactive in a stable, essentially irreversible environment. To put it in perspective, based on the previously discussed titration curves (where 29.0 ml of 1.0 N H_2SO_4 was used to reduce the pH of a 4.00 g. sample to 2 s.u.), a single cubic yard of this same remediated material could be mixed with 48 gallons of commercial concentrated sulfuric acid and no hydrogen sulfide gas would be released. In terms of the 0.005 M (0.01 N) sulfuric acid used in the SW-846 reactive sulfide test, this would correspond to 173,800 gallons, at that dilution, per cubic yard. Assuming acid rain has a pH of 4 s.u., 17,380,000 gallons would have to be contained and mixed with one cubic yard of the treated material to approximate the same conditions, and the pH still could not be lowered below 4.

COMMENT NUMBER: 4-D-1 continued
DOCKET NUMBER: LD12-00062
COMMENTER: ITEX COMPANIES
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

pH RELATIONSHIPS IN THE H_2S SYSTEM



$H_2S + OH^- \rightarrow HS^- + H_2O$ $Ka_1 = 9.1 \times 10^{-8}$ $pKa_1 = 7.04$
$HS^- + OH^- \rightarrow S^{2-} + H_2O$ $Ka_2 = 1.1 \times 10^{-12}$ $pKa_2 = 11.96$

ITEX-014.DWG

COMMENT NUMBER: 4-D-1 continued

DOCKET NUMBER: LDR2-00062

COMMENTER: ITEX COMPANIES

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Sulfide Treatment Alternatives

Based on the previously discussed considerations, we request that EPA consider one of two options for the treatment standard for the Reactive Sulfides Subcategory. If the Agency chooses to use treatment methodologies as the treatment standard, add "Precipitation to insoluble sulfide salts and solidification in an alkaline mixture" as an acceptable treatment method. Since the matrix interferences preclude testing for the actual sulfide salts or for sulfates, perhaps a better approach would be a treatment standard based on exposure levels of hydrogen sulfide gas. Since ITEX has been consistently treating sulfide containing wastes to levels of reactive sulfides below the detection level of 2.5 ppm, we do not have a treatment based number to offer. Our experience has shown that the standard method in SW-846 for testing for reactive sulfides using a detection tube is consistent and reproducible. We have not had the same experience with the titration method described in SW-846 for determination of reactive sulfides, so we also suggest standardizing the test method to one method: the SW-846 method utilizing a detection tube.

COMMENT NUMBER: 4-D-1 continued
DOCKET NUMBER: LD12-00062A
COMMENTER: ITEX COMPANIES
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

EXHIBIT A

ITEX ENGINEERING, INC.

SAMPLE #	RESEARCH 1
LAB #	744
DATE RECEIVED	DECEMBER 7, 1989
DATE COMPLETED	DECEMBER 22, 1989

TOTAL METALS EPA METHOD # 7190
(values in ppm)

Antimony	5.3
Arsenic	1.1
Barium	40.8
Beryllium	<1.0
Cadmium	<0.1
Chromium	172.0
Cobalt	5.8
Lead	602.5
Mercury	1.0
Nickel	13.5
Selenium	0.14
Vanadium	15.0

VOLATILES EPA METHOD # 8000
(values in mg/kg)

Benzene	<10.0
Carbon Disulfide	<10.0
Chlorobenzene	<10.0
Chloroform	<10.0
1,2-Dichloroethane	<10.0
1,4-Dioxane	<10.0
Ethyl Benzene	<10.0
Ethylene Dibromide	<10.0
Methyl-ethyl-ketone	<10.0
Styrene	<10.0
Toluene	<10.0
Xylenes	<10.0

SEMIVOLATILE ACID-
EXTRACTABLE COMPOUNDS EPA METHOD # 8040
(values in mg/kg)

Benzenethiol	<10.0
Cresols	<10.0
2,4-Dimethylphenol	<10.0
2,4-Dinitrophenol	<10.0
4-Nitrophenol	<10.0
Phenol	<10.0

SEMIVOLATILES BASE/NEUTRAL
EXTRACTABLE COMPOUNDS EPA METHOD # 8270
(values in mg/kg)

Anthracene	301.9
Benzo(a) anthracene	<10.0
Benzo(b) fluoranthene	<10.0
Benzo(k) fluoranthene	<10.0
Benzo(a) pyrene	<10.0
Bis(2,ethylhexyl) phthalate	<10.0
Butyl benzyl phthalate	<10.0
Chrysene	<10.0
Dibenz(a,h) acridine	<10.0
Dibenz(a,h) anthracene	<10.0
Dichlorobenzenes	<10.0
Diethyl phthalate	<10.0
7,12-Dimethylbenz(a) anthracene	<10.0
Dimethyl phthalate	<10.0
Di(n) butyl phthalate	<10.0
Di(n) octyl phthalate	<10.0
Fluoranthene	<10.0
Indene	<10.0
Methyl chrysene	<10.0
1-Methyl Naphthalene	<10.0
Naphthalene	71.8
Phenanthrene	<10.0
Pyrene	261.0
Pyridine	<10.0
Quinoline	<10.0

REACTIVE SULFIDES (ppm)	2750

Gerald R. Roehrig, Ph.D.
Director, Science & Technology

COMMENT NUMBER: 4-D-1 continued
DOCKET NUMBER: LD12-00062A
COMMENTER: ITEX COMPANIES
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

Standard curves for the reactive sulfide quantitation were made up as follows: Solutions of sodium sulfide nonahydrate were prepared at appropriate concentrations (30 to 3000 ppm). An amount of solution equivalent to the amount of sample normally used in the test was placed in the reaction flask and the test conducted using the hydrogen sulfide detection tubes. The detection tube readings were plotted against the standard values to generate the calibration curves.

Since 100-2000 ppm tubes were not available from the supplier, 2.5-300 ppm tubes were substituted. Two standard curves were generated; #1 (Low Range) for tube readings less than 300 ppm, and #2 (High Range) for solutions which read greater than 300 ppm. In the High Range case, the time when 300 ppm was reached was noted (stop watch) and a calibration curve based on ppm H_2S vs. time was prepared. A second set of Low Range standards was prepared on a different date; those data were included in the standard curve.

The data obtained was as follows:

Low Range, November 16, 1989

Standard Solution	Tube Reading
1 gram, 30 ppm	23 ppm
1 gram, 150 ppm	99 ppm
1 gram, 300 ppm	198 ppm

Low Range, November 21, 1989

1 gram, 300 ppm	225 ppm
1 gram, 150 ppm	120 ppm

High Range, November 16, 1989

Standard Solution	Time to Reach 300 ppm
1500 ppm	16.00 min.
3000 ppm	3.06 min.

High Range, November 21, 1989

500 ppm	24.41 min.

COMMENT NUMBER: 4-D-1 continued

DOCKET NUMBER: LD12-00062A

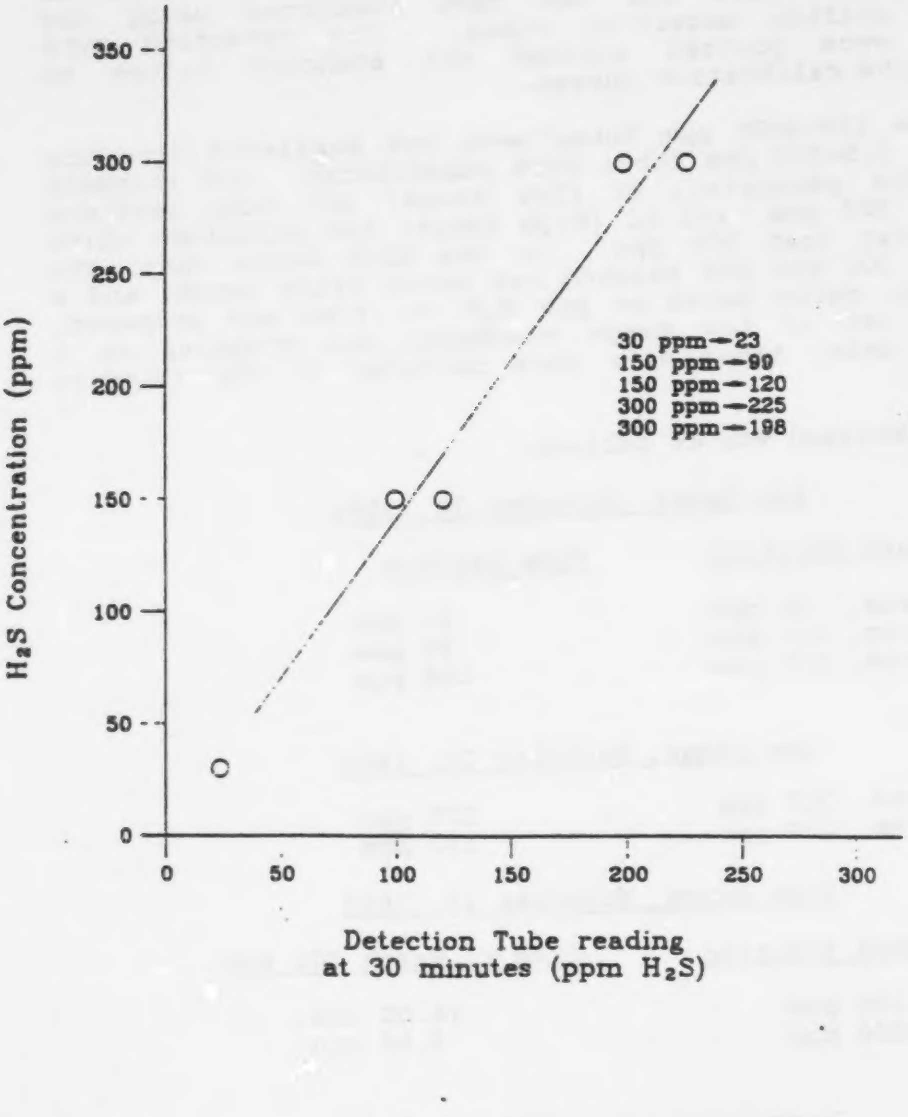
COMMENTER: ITEX COMPANIES

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

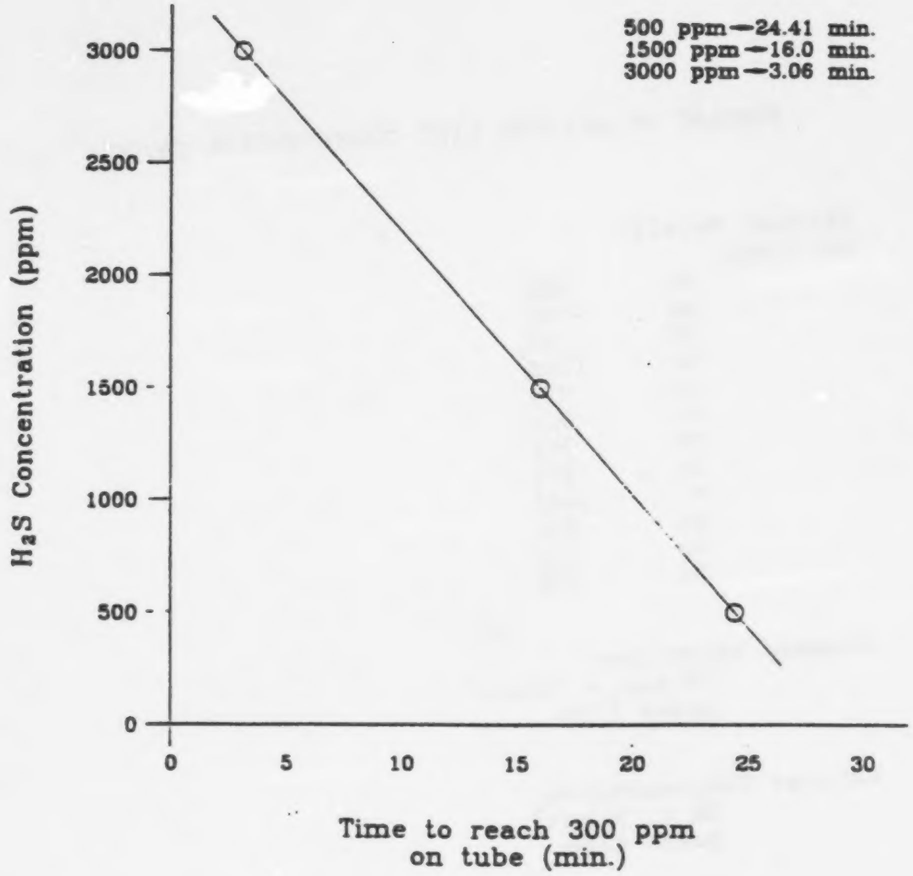
COMMENT: Sulfide Treatment Alternatives

H_2S Release
Calibration Curve
(Low Range)



COMMENT NUMBER: 4-D-1 continued
DOCKET NUMBER: LD12-00062A
COMMENTER: ITEX COMPANIES
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

H_2S Release
Calibration Curve
(High Range)



COMMENT NUMBER: 4-D-1 continued

DOCKET NUMBER: LD12-00062B

COMMENTER: ITEX COMPANIES

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Sulfide Treatment Alternatives

EXHIBIT B

ITEX ENGINEERING, INC.

SUMMARY OF SKINNER LIST CONSTITUENTS QA/QC

Skinner Metals:
Recovery:

Ba	89%
Be	94%
Cd	98%
Cr	101%
Co	97%
Ni	95%
Pb	96%
Sb	86%
V	104%
As	95%
Hg	95%
Se	94%

Skinner Volatiles:
DB Run = "Blank"
Quant File

Skinner Semivolatiles:
DB = "Blank"
Quant File

COMMENT NUMBER: 4-D-1
DOCKET NUMBER: LD12-00062
COMMENTER: ITEX Companies
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that the stabilization/solidification process of insoluble sulfide salts described by the ITEX Companies is an applicable treatment technology that could be used to successfully remove the reactive characteristic of D003 sulfide wastes. Furthermore, the stabilization/solidification process is included in the list of applicable technologies for treatment of D003 wastes. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

COMMENT NUMBER: 4-D-2
DOCKET NUMBER: LD12-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes & P&U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Alternatives
COMMENT:

I. Introduction

Exxon Chemical Company markets chemical oxidizers in the petrochemical industry to scavenge sulfidic material from process wastewater. These sulfidic materials include hydrogen sulfide gas entrained in water, simple inorganic sulfides, organic sulfides including complex mercaptans, and metal sulfides primarily as iron sulfide. When acidified, any of these compounds releases hydrogen sulfide gas.

A refinery in the Los Angeles area uses a chemical oxidation process developed by Exxon Chemical to remove reactive sulfide materials from process water before it is disposed into the Los Angeles County Sanitation District sewer system. Simple sulfides such as entrained hydrogen sulfide are easily scavenged from the water with hydrogen peroxide. Other sulfides, particularly organic sulfides and mercaptans, cannot be oxidized to sufficient levels using solely hydrogen peroxide to satisfy the Sanitation District. It has imposed a 1 ppm upper limit concentration for organic sulfides. The Sanitation District also prescribes a test method for determining organic sulfide concentration for all permit applicants known to discharge such materials.

Exxon Chemical Company uses a treatment process employing chlorine dioxide to scavenge organic sulfides from process wastewaters to meet the Sanitation District specification. The result of the treatment process is a single liquid discharge that meets all County Sanitation District pretreatment requirements.

The chlorine dioxide generation technology used by Exxon is unique. Patented by Rio Linda Chemical Co., it produces a chlorine-free effluent which eliminates formation of unwanted halogenated organic byproducts, processes large volumes of water, and is physically compact and easily transportable. Another unique feature of this patented technology is the formation of chlorine dioxide prior to contact with the eductor drive stream. The contaminated process stream drives the generation and chemical feed system, and no external fresh water feed is required. The resulting chemical feed system is inherently safe and prohibits direct contact of the chlorine dioxide precursor chemicals with the process stream. Other chlorine dioxide systems cannot make such claims.

II. Treatment Schematic

Figure 1 is the treatment schematic of the chemical oxidation process at the Los Angeles refinery. Wastewater is transferred to a 5,000 barrel storage tank from crude distillation and gasoline, jet A-1, and diesel production units

COMMENT NUMBER: 4-D-2 (CONTINUED)
DOCKET NUMBER: LD12-B0056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes & P&U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Alternatives
COMMENT:

in the refinery. First, the water is circulated to mix the contents homogeneously. After circulation, oxidation treatment begins.

III. Treatment Process and Data Collection

The waste stream is pre-treated to remove simple sulfides solely for economic reasons. Typically the simple sulfides are removed from the wastewater by adding 50 percent hydrogen peroxide. Other options such as air stripping are available. The amount of hydrogen peroxide added is determined by the concentration of simple sulfides detected in the wastewater. Attachment 1 is a laboratory report showing simple sulfide levels over 500 mg/l in a recent wastewater stream. The peroxide is added by an eductor to insure proper mixing. Simple sulfides as hydrogen sulfide are monitored with lead acetate until complete oxidation to sulfates is completed. The organic sulfides are not reacted and remain in the wastewater. The water circulates back to the storage tank for retention.

Subsequently the water is treated with chlorine dioxide to remove complex sulfides. The amount of water treated is monitored with a turbine-type flow meter. Because of the dynamics of a Venturi-type eductor used to add the oxidant, the flow rate is constant for a given inlet fluid pressure. The amount of input chemicals (sodium chlorite, sodium hypochlorite, and hydrochloric acid) is controlled by rotometers. Since chlorine dioxide is not stable over time, it must be generated at the point of application via chemical reaction. The chemicals are aspirated together by the vacuum created by the throttling of the wastewater through the venturi. A schematic of the system is shown in Figure 2. A constant vacuum of 30 mm Hg allows for precise addition of chemical feed components. Flow and feed rate data are recorded to determine the amount of chlorine dioxide added, and the concentration of chlorine dioxide in the wastewater after treatment.

Samples are collected periodically in 16 ounce glass prescription bottles from points before and after chlorine dioxide addition. A new bottle is used every time to insure that the sample is not contaminated.

Laboratory analysis indicates that the reactive sulfide compounds are immediately scavenged from the wastewater upon addition of the chemical oxidizer. In this application, the wastewater was treated by one of two methods, depending on the availability of storage tanks. Use of both methods demonstrates the versatility of the treatment regime.

COMMENT NUMBER: 4-D-2 CONTINUED
DOCKET NUMBER: LD12-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

TREATMENT SCHEMATIC

Oxidation of Reactive Sulfides

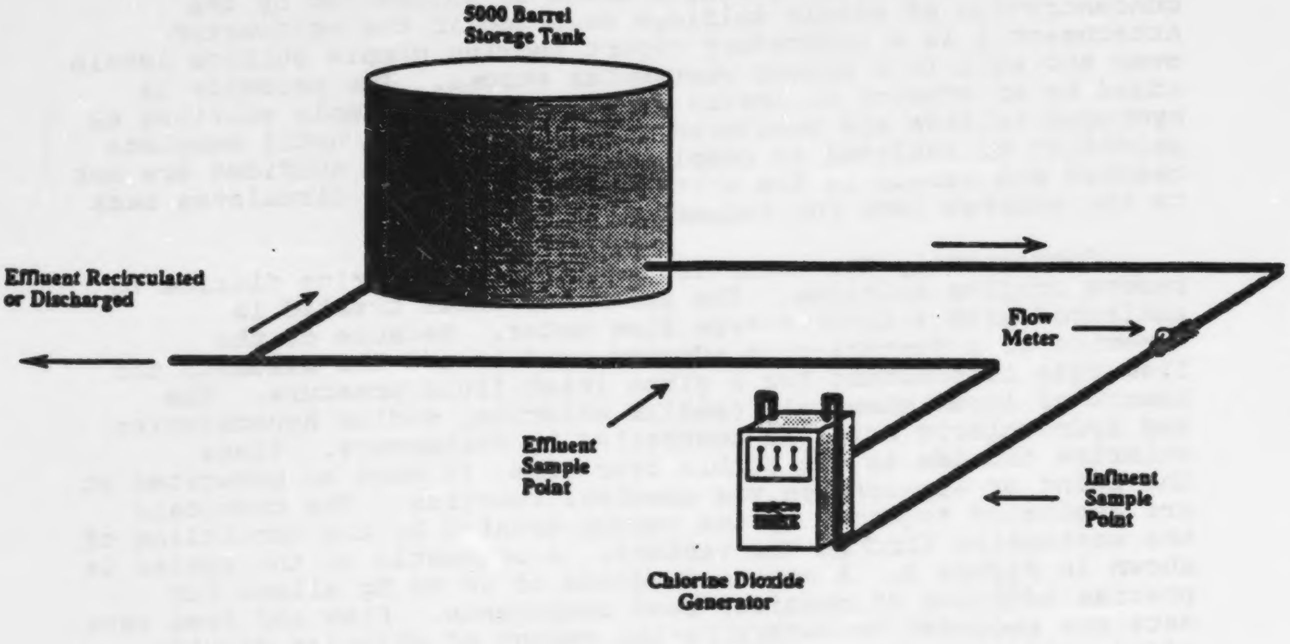

5000 Barrel Storage Tank
Effluent Recirculated or Discharged
Flow Meter
Effluent Sample Point
Influent Sample Point
Chlorine Dioxide Generator

Figure 1.

1) **The wastewater could be circulated, adding chlorine dioxide in the circulation loop, until the tank met specification.**

2) **The wastewater could be treated by emptying one tank into another storage tank, with chlorine dioxide being added into the flowing wastewater.**

COMMENT NUMBER: 4-D-2 CONTINUED
DOCKET NUMBER: LD12-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

CHLORINE DIOXIDE GENERATION PROCESS

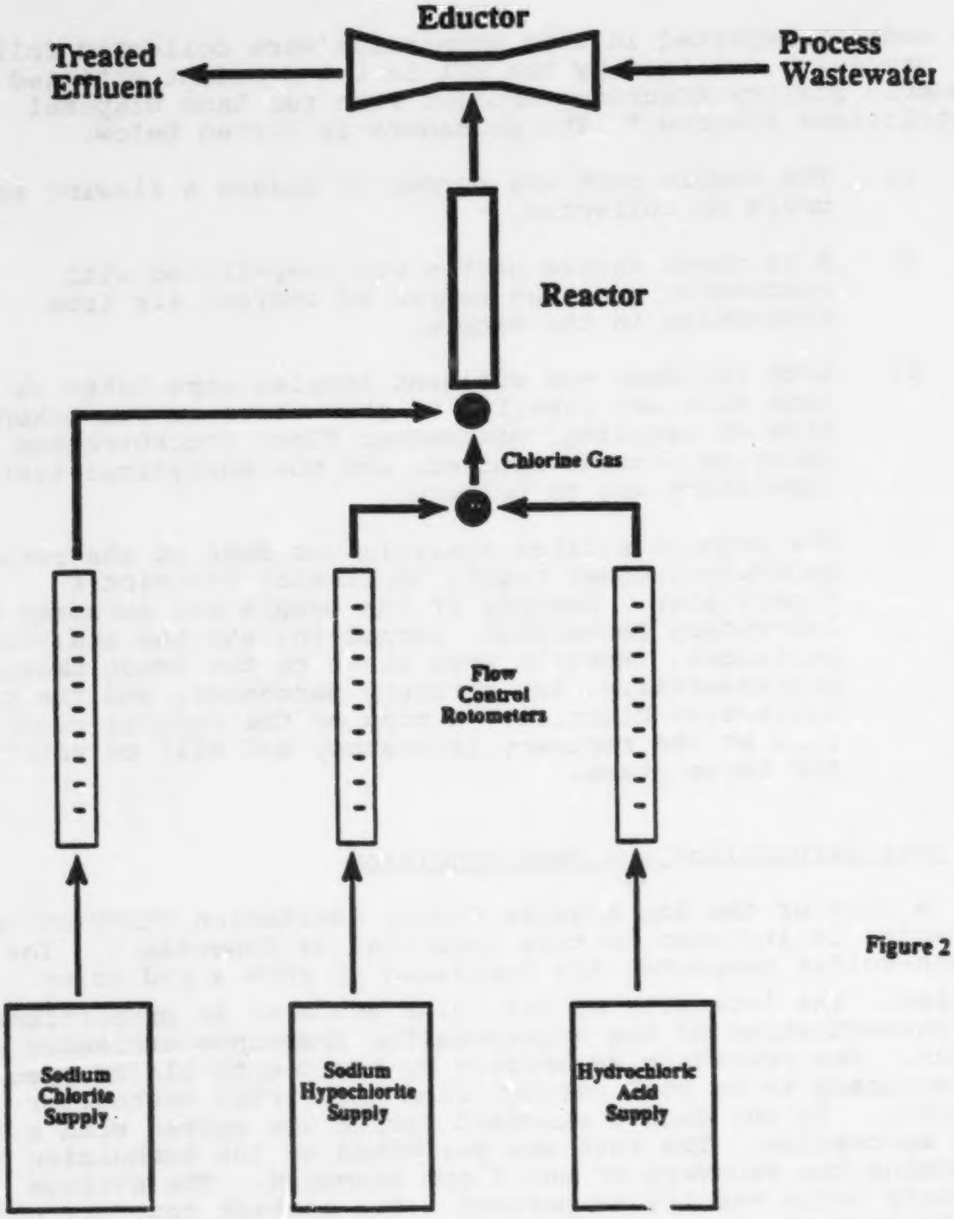

Eductor
Treated Effluent
Process Wastewater
Reactor
Chlorine Gas
Flow Control Rotometers
Sodium Chlorite Supply
Sodium Hypochlorite Supply
Hydrochloric Acid Supply

Figure 2

COMMENT NUMBER: 4-D-2 CONTINUED
DOCKET NUMBER: LD12-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

If tankage is available to hold processed wastewater, method 2 is preferred since less processing time and fewer chemical input materials are required. In Table 1, Batches 1-4 were processed using recirculation. Batches 5-10 were treated "straight-line" using method 2.

The samples reported in this submission were collected following the procedure outlined by the EPA in the document entitled "Generic Quality Assurance Project Plan for Land Disposal Restrictions Program." The procedure is listed below.

1) The sample port was purged to insure a flowing sample could be collected.

2) A 16 ounce sample bottle was over-filled with wastewater and then capped to prevent air from entraining in the sample.

3) Both influent and effluent samples were taken at the same time and labelled to show where it was taken, the time of sampling, wastewater flow, concentration of chlorine dioxide applied, and the analytical test the laboratory was to perform.

4) The organic sulfide analysis was done at the refinery's laboratory under County Sanitation District's supervision. Custody of the sample was accepted by the laboratory technician, logged in, and the analysis was performed. Results were given to the Exxon Chemical representative, key refinery personnel, and the County Sanitation District. A copy of the results remains on file at the refinery laboratory and will be retained for three years.

IV. Test Methodology and Test Precision

A copy of the Los Angeles County Sanitation District test procedure is included in this submittal as Appendix 1. The organo-sulfur compounds are complexed to form a red color complex. The intensity of the color produced is proportional to the concentration of the organo-sulfur compounds expressed as sulfur. The procedure as written by the County claims precision and accuracy to be 90.3 percent from industrial wastewater matrices. In our data a standard sample was spiked with a 1 ppm lead mercaptide. The test was performed by the technician to determine the recovery of the 1 ppm standard. The average recovery value was 100.48 percent. The poorest recovery observed was 93 percent.

D003-Characteristic Reactive Wastes and P and U Wastes 6
Containing Reactive Listing Constituents
Sulfide Treatment Alternatives

COMMENT NUMBER: 4-D-2 CONTINUED
DOCKET NUMBER: LDI2-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE:
SUBISSUE:
COMMENT:

Table 1

BDAT Organic Sulfide Data

Batch #	Date	Time of Sampling Hrs.	Gallons/Batch in thousands of gallons	Gallons/Min.	Cl02 Chemical Use lbs./ min.	Influent Concentration mg/l	Effluent Concentration mg/l	Standard Concentration Spiked Value mg/l	Standard Concentration Measured Value mg/l	Recovery Value
1	21-Dec-88	0900	134.4	200	1.67	35.50	0.00	1.00	0.98	98%
		1000		200	1.67	23.60	0.00	1.00	0.98	98%
		1200		200	1.67	12.20	0.00	1.00	0.98	98%
		1400		200	1.67	8.40	0.00	1.00	0.98	98%
2	12-Apr-89	0800	138.6	200	1.67	35.20	0.00	1.00	1.05	105%
		1000		200	1.67	21.40	0.00	1.00	1.05	105%
		1200		200	1.67	16.60	0.00	1.00	1.05	105%
		1400		200	1.67	5.60	0.00	1.00	1.05	105%
3	18-May-89	0900	126.0	200	2.08	22.80	0.00	1.00	1.00	100%
		1100		200	2.08	10.40	0.00	1.00	1.00	100%
		1400		200	2.08	5.40	0.00	1.00	1.00	100%
4	14-Jul-89	0900	130.2	200	1.67	15.60	0.00	1.00	1.02	102%
		1000		200	1.67	9.30	0.00	1.00	1.02	102%
		1300		200	2.08	6.40	0.00	1.00	1.02	102%
		1500		200	2.08	3.20	0.00	1.00	1.02	102%
5	18-Jul-89	1000	142.8	200	1.25	17.64	0.00	1.00	0.98	98%
		1000		200	1.67	17.64	0.00	1.00	0.98	98%
		1000		200	2.08	17.64	0.00	1.00	0.98	98%
		1000		200	2.50	17.64	0.00	1.00	0.98	98%
6	25-Jul-89	0900	113.4	210	1.67	13.56	0.10	1.00	1.01	101%
		1400		210	1.67	13.56	0.23	1.00	1.01	101%
	27-Jul-89	1000		200	1.67	8.33	0.10	1.00	1.01	101%
		1500		200	1.67	8.33	0.33	1.00	1.01	101%
7	22-Sep-89	1200	142.8	210	2.50	21.60	0.00	1.00	1.02	102%
		1300		210	2.50	21.60	0.00	1.00	1.02	102%
8	10-Oct-89	1100	138.5	200	1.45	22.16	0.00	1.00	1.00	100%
		1130		200	1.45	22.16	0.00	1.00	1.00	100%
		1000		200	1.45	22.16	0.00	1.00	1.00	100%
		1230		200	1.45	22.16	0.00	1.00	1.06	106%
9	9-Nov-89	1000	113.4	200	2.50	13.16	0.00	1.00	0.99	99%
		1200		200	2.50	12.97	0.00	1.00	0.99	99%
10	20-Nov-89	1000	134.4	200	2.92	12.58	0.75	1.00	0.99	99%
		1400		200	2.92	12.58	0.89	1.00	0.93	93%
			Total Number of Gallons Treated			Average Influent Concentration	Average Effluent Concentration			Average Recovery Value
			1312.5			16.03	0.072			100.48%

COMMENT NUMBER: 4-D-2 CONTINUED

DOCKET NUMBER: LD12-00056

COMMENTER: EXXON CHEMICAL COMPANY

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Sulfide Treatment Alternatives

COMMENT:

BDAT Data Statistical Analysis

Batch #	Time of Sampling hours	Influent Concentration mg/l	ln(Influent)	(ln(Influent))2	Effluent Concentration mg/l *	ln(Effluent)	(ln(Effluent))2
1	0800		3.5695	12.7416	0.10	-2.3026	5.3019
	1000	23.60	3.1612	9.9935	0.10	-2.3026	5.3019
	1200		2.5014	6.2571	0.10	-2.3026	5.3019
	1400	8.40	2.1282	4.5294	0.10	-2.3026	5.3019
2	0800	35.20	3.5610	12.6810	0.10	-2.3026	5.3019
	1000	21.40	3.0634	9.3843	0.10	-2.3026	5.3019
	1200	16.60	2.8094	7.8927	0.10	-2.3026	5.3019
	1400	5.60	1.7228	2.9679	0.10	-2.3026	5.3019
3	0800	22.80	3.1268	9.7766	0.10	-2.3026	5.3019
	1100	10.40	2.3418	5.4840	0.10	-2.3026	5.3019
	1400	5.40	1.6864	2.8439	0.10	-2.3026	5.3019
4	0800	15.60	2.7473	7.5476	0.10	-2.3026	5.3019
	1000	9.30	2.2300	4.9730	0.10	-2.3026	5.3019
	1300	6.40	1.8563	3.4458	0.10	-2.3026	5.3019
	1600	3.20	1.1631	1.3529	0.10	-2.3026	5.3019
5	1000	17.64	2.8702	8.2380	0.10	-2.3026	5.3019
	1000	17.64	2.8702	8.2380	0.10	-2.3026	5.3019
	1000	17.64	2.8702	8.2380	0.10	-2.3026	5.3019
	1000	17.64	2.8702	8.2380	0.10	-2.3026	5.3019
6	0800	13.56	2.6071	6.7971	0.10	-2.3026	5.3019
	1400	13.56	2.6071	6.7971	0.23	-1.4697	2.1599
	1000	8.33	2.1199	4.4938	0.10	-2.3026	5.3028
	1600	8.33	2.1199	4.4938	0.33	-1.1087	1.2291
7	1200	21.60	3.0727	9.4414	0.10	-2.3026	5.3019
	1300	21.60	3.0727	9.4414	0.10	-2.3026	5.3019
8	1100	22.16	3.0983	9.5994	0.10	-2.3026	5.3019
	1130	22.16	3.0983	9.5994	0.10	-2.3026	5.3019
	1030	22.16	3.0983	9.5994	0.10	-2.3026	5.3019
	1230	22.16	3.0983	9.5994	0.10	-2.3026	5.3019
9	1000	13.16	2.5772	6.6419	0.10	-2.3026	5.3019
	1200	12.97	2.5626	6.5671	0.10	-2.3026	5.3019
10	1000	12.58	2.5321	6.4116	0.75	-0.2877	0.0828
	1400	12.58	2.5321	6.4116	0.89	-0.1165	0.0136

* Data corrected to reflect accuracy of test method.

Sum:		529.07	87.3460	240.7178	5.10	-69.768	157.2412
Sample Size:		33	33		33	33	
Mean:		16.03	2.6468	7.2946	0.15	-2.1139	4.7649
Std. Deviation		17.74	2.7008		0.2201	2.1628	
C99(efflt)	0.36						
Variability Factor(efflt)	2.40						

Table 2

COMMENT NUMBER: 4-D-2 CONTINUED
DOCKET NUMBER: LD12-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

V. Results

Exxon Chemical began treating wastewater at this location in September of 1988. Approximately twenty five, 3500 barrel tanks have been treated at the time of this submittal. Table 1 shows the data collected following strict EPA QA/QC procedures over the past year on ten tanks of water treated. Only complex organic sulfide data is presented, since simple sulfides present in the wastewater were oxidized using hydrogen peroxide. The data covers Exxon Chemical Company's treatment of over a million gallons of wastewater with an average influent organic sulfide concentration of approximately 16 ppm. Most of these organic sulfides are mercaptan molecules which are the most difficult sulfidic materials to oxidize. The average effluent concentration of these species was 0.07 ppm. The average percentage reduction was 99.55 percent.

A representative volatile organic GCMS analysis of the treated wastewater is attached as Appendix 2 to show other compounds in the wastewater. The sample contains petroleum distillates characteristic of refinery wastewater. Chlorine dioxide does not react with these distillates to either oxidize solvents such as acetone, benzene, toluene, or xylene; or to chlorinate these volatile organic compounds.

VI. Statistical Analysis

The range on this method's limit of detection is given at 0.1 ppm organic sulfide. This value was inserted in all effluent concentrations less than 0.1 ppm in the effluent data table for statistical analysis. Statistical analysis as prescribed by the BDAT submittal documents is shown in Table 2. The C99 for the effluent data set is 0.36 ppm organic sulfides. This value is less than the 1.0 ppm standard set by the County. The data set has 33 samples taken over a year's period which indicates treatment is consistent over time.

Actual laboratory data and operating data are on file at the refinery. Copies of this data are available for inspection from Exxon Chemical Company upon request.

COMMENT NUMBER: 4-D-2 CONTINUED
DOCKET NUMBER: LDR-0056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Sulfide Treatment Alternatives

VII. Other Commercial Operations, Miscellaneous

Other commercial applications of this technology include but are not limited to the use of chlorine dioxide for the destruction of oxidizable organic and inorganic materials including sulfidic materials that plug oilfield water injection and production wells, and surface equipment; and destruction of cyanide in gold mining tailings effluent.

Because of experience gained in the application of this technology and a perceived need in the hazardous waste treating industry, Exxon Chemical Company/Rio Linda Chemical offered to demonstrate this technology to the EPA under the auspices of the Superfund Innovative Technology Evaluation (SITE) program. The offer was accepted and during the course of qualifying the technology for demonstration, John Martin of EPA (513 569-7758; FTS: 684-7758) viewed the equipment and technology in operation.

COMMENT NUMBER: 4-D-2
DOCKET NUMBER: LD12-00056
COMMENTER: EXXON CHEMICAL COMPANY
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that the chemical oxidation process described by Exxon Chemical Company is an applicable treatment technology that could be used to successfully remove the reactive characteristic of D003 sulfide wastes. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

COMMENT NUMBER: 4-D-3

DOCKET NUMBER: LD12-00081

COMMENTER: Envirosafe Management Services Inc

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Sulfide Treatment Alternatives

EPA does not address the viability of stabilization technology for reactive sulfide wastes. In some cases, sulfides are used to lower solubility and aid in the binding of certain metals during stabilization.

COMMENT NUMBER: 4-D-3
DOCKET NUMBER: LD12-00081
COMMENTER: Envirosafe Management Service Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that stabilization is an applicable treatment technology that could be used to remove the reactive characteristic of D003 sulfide wastes and will be included in the treatment standard. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-4
Docket Number: LD12-00110
Commenter: Thermal KEM / Cyano KEM
Issue: D003-Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing Reactive Listing Constituents
Comment: Sulfide Treatment Alternatives

(b) Reactive and Sulfide Standard

In its proposed BDAT treatment standard for D003 Reactive Sulfides, EPA is essentially requiring sulfide destruction followed by precipitation to insoluble sulfates. We ask the Agency to amend this standard to enable commercial treaters to use sulfides in the treatment process to produce a metal sulfide precipitate.

We concur with the Agency that the presence of mercaptans can complicate the treatment of reactive sulfide wastes; however, mercaptans are not present in all wastes containing reactive sulfide. Many organic-free reactive sulfide wastes can be beneficially used in treating metal-bearing wastes. The use of reactive sulfides in treating such wastes results in the precipitation of metals as metal sulfides. In comparison to metal hydroxides, which would result from treating metal wastes with hydroxide reagents, metal sulfides are less soluble by orders of magnitude. The use of reactive sulfide wastes in the treatment process is especially useful in treating wastes which contain low concentrations of metals. Due to its affinity for combining with metals, reactive sulfide produces a more highly polished effluent than the effluent that results from hydroxide precipitation. Therefore, we request the Agency to amend the standard to provide for the beneficial use of organic-free reactive sulfides in the treatment process.

COMMENT NUMBER: 4-D-4
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that the precipitation process to insoluble metal sulfides described by this commenter is an applicable treatment technology that could be used to remove the reactive characteristic of D003 sulfide wastes. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-5

Docket Number: LD12-00172

Commenter: HWTC

Issue: D003- Characteristic Reactive Wastes and P and U

Subissue: Wastes Containing Reactive listing constituents

Comment: — Sulfide treatment alternatives

2. Reactive Sulfide Wastes

The BDAT treatment standard for D003 reactive sulfides 261.23(a)(5) should be amended to enable commercial waste treaters to use organic-free reactive sulfides as treatment agents.

In its proposed BDAT treatment standard for D003 Reactive Sulfides, EPA is essentially requiring sulfide destruction followed by precipitation to insoluble sulfates. We ask the Agency to amend this standard to enable commercial treaters to use sulfides in the treatment process to produce a metal sulfide precipitate.

Comment Number: 4-D5 (continued).
Docket Number: LD12- 00172..
Commenter: HWTC
Issue: D003 – Characteristic Reactive Wastes and P and U
Subissue: Wastes containing reactive listing constituents
Comment: – Sulfide treatment alternatives

We concur with the Agency that the presence of mercaptans can complicate the treatment of reactive sulfide wastes; however, mercaptans are not present in all wastes containing reactive sulfide. Many mercaptan- and organic-free reactive sulfide wastes can be beneficially used in treating metal-bearing wastes. The use of reactive sulfides in treating such wastes results in the precipitation of metals as metal sulfides. In comparison to metal hydroxides, which would result from treating metal wastes with hydroxide reagents, metal sulfides are less soluble by orders of magnitude. The use of reactive sulfide wastes in the treatment process is especially useful in treating wastes which contain low concentrations of metals. Due to its affinity for combining with metals, reactive sulfide produces a more highly polished effluent than the effluent that results from hydroxide precipitation. Therefore, we request the Agency to amend the standard to provide for the beneficial use of mercaptan-free reactive sulfides in the treatment process.

COMMENT NUMBER: 4-D-5

DOCKET NUMBER: LD12-00172

COMMENTER: Hazardous Waste Treatment Council

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Sulfide Treatment Standard

RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that the precipitation process to insoluble metal sulfide described by this commenter is an applicable treatment technology that could be used to remove the reactive characteristic of D003 sulfide wastes. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

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Comment Number: 4-D-6
Docket Number: LD12-00187
Commenter: CMA
Issue: D003- Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents
Subissue: Sulfide treatment Alternatives
Comment:

Despite this commonly used, effective recovery, the proposed treatment standard for D003 reactive sulfides does not recognize recovery as a treatment option. The Panel strongly urges EPA to revise this standard to allow recovery as an alternative. This will encourage continued beneficial reuse of these valuable resources.

Comment Number: 4-D-6 (continued)
Docket Number: LD12-00187
Commenter: CMA
Issue: D003- Characteristic Reactive Wastes and P and U
Subissue: Wastes containing reactive listing constituents
Comment: - Sulfide treatment alternatives

4. **Recovery Should Be Allowed As A Treatment Standard For D001 Ignitable Reactives And D003 Reactive Sulfides.**

EPA proposes alkaline chlorination, chemical oxidation, or incineration followed by precipitation to insoluble sulfates as methods of treatment for D003 reactive sulfides. See 54 Fed. Reg. at 48,426/3. EPA also proposes deactivation as a method of treatment for D001 ignitible reactives. Id. at 48,422/2. Spent catalysts in these two categories of waste are commonly recovered and recovery should be an acceptable treatment method.

Specifically, spent refinery catalysts are generated on a sporadic basis but in high volumes. They may be classified as D003 reactive sulfides, D001 ignitable reactives, or neither, depending on the differences in reactor design of the refinery as well as crude oil constituent make-up.

Comment Number: 4-D-6 (continued)
Docket Number: LD12-00187
Commenter: CMA
Issue: D003- Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents.
Subissue: — Sulfide treatment alternatives
Comment:

The majority of spent refinery catalysts are recycled to recover molybdenum or vanadium compounds. A by-product containing alumina, cobalt, and nickel is generated. This by-product is further processed to recover the cobalt and nickel values, and an alumina slag results which is useable as construction material for roadbed or concrete aggregate. The recovery process utilizes pyrometallurgical as well as hydrometallurgical chemical processing to recover the metals molybdenum and vanadium while producing the impure alumina by-product. The pyrometallurgical process completely oxidizes the metals and sulfur compounds thus completely eliminating the characteristic of ignitibility.

Comment Number: 4-D-6 (continued)
Docket Number: LD12-00187
Commenter: CMA
Issue: D003 - Characteristic Reactive Wastes and P and U Wastes
Subissue: containing reactive listing constituents
Comment: — Sulfide treatment alternatives

Third, EPA should revise and clarify the proposed treatment standards for P119 and P120 nonwastewaters, D001 ignitable reactives, and D003 reactive sulfides to allow all forms of currently used and demonstrated recovery of these wastes. This will promote beneficial recycling of these valuable metal constituents.

COMMENT NUMBER: 4-D-6
DOCKET NUMBER: LD12-00187
COMMENTER: CMA
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that the recovery described by this commenter is an applicable treatment technology that could be used to remove the reactive characteristic of D003 sulfide wastes. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-7

Docket Number: LD12-00212

Commenter: ITEX Services, Inc.

Issue: D003: Characteristic Reactive Wastes and P and U Waste Containing reactive listing constituents

Subissue:

Comment: — Sulfide treatment alternatives

On December 28, 1989, I met with Ms. Rhonda Craig of your staff and Ms. Laura Fargo and discussed with them our comments on the Land Disposal Restriction treatment standard for the Reactive Sulfides Subcategory. They indicated that they had a concern with our "proprietary mix" that was a part of the described treatment method. They were also concerned with any other contaminants or characteristics that may be introduced through treatment. This week our lab performed additional analyses on the treated material from the experiment described in the December submittal. Attached are results for total Skinner List metals, total Skinner List organics, TCLP metals and other applicable characteristics. These results indicate that no additional characteristics or contaminants are being introduced during treatment which would implicate other land disposal restrictions.

Again, this information is being submitted simultaneously to the EPA RCRA Docket. I am also submitting to the RCRA Docket, under Confidential Business Information procedures, a description of the proprietary mix so that the Agency may be assured that these are commercially available materials.

Please call me at 1-800-458-ITEX with any questions. I would like to thank you and your staff for the courteous attention.

Comment Number: 4-D-7 (continued)
Docket Number: LD12-00212.
Commenter: ITEX Services, Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: — Sulfide treatment alternatives

SAMPLE # RESEARCH 1-T
LAB # 744-T
DATE RECEIVED DECEMBER 7, 1989
DATE COMPLETED JANUARY 4, 1989

TCLP METALS	Values in ppm	% SPIKE RECOVERY
Arsenic	<0.02	97.0
Barium	<1.0	89.0
Cadmium	<0.1	102.0
Chromium	<1.0	96.0
Lead	<0.2	98.0
Mercury	<0.02	100.0
Selenium	<0.02	94.0
Silver	<0.5	99.0

TOTAL METALS EPA METHOD # 7190	Values in ppm	% SPIKE RECOVERY
Antimony	1.50	99
Arsenic	2.06	98
Barium	91.0	89
Beryllium	<1.0	91
Cadmium	1.30	80
Chromium	152.8	100
Cobalt	11.3	82
Lead	514.3	90
Mercury	1.14	90
Nickel	22.3	87
Selenium	<1.0	94
Vanadium	25.8	90

pH (solid:distilled water 1:10)	11.10
REACTIVE SULFIDES (ppm)	<2.5
INGNITABILITY (degrees F)	N/A
PAINT FILTER	0

Gerald R. Roehrig, Ph.D.
Director, Science & Technology

Comment Number: 4-D-7 (continued)
Docket Number: LD12-00212
Commenter: ITEX Services, Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: —Sulfide treatment alternatives

SAMPLE #	RESEARCH 1-T
LAB #	744-T
DATE RECEIVED	DECEMBER 7, 1989
DATE COMPLETED	JANUARY 4, 1989

VOLATILES EPA METHOD # 8000
(values in mg/kg)

Benzene	<10.0
Carbon Disulfide	<10.0
Chlorobenzene	<10.0
Chloroform	<10.0
1,2-Dichloroethane	<10.0
1,4-Dioxane	<10.0
Ethyl Benzene	<10.0
Ethylene Dibromide	<10.0
Methyl-ethyl-ketone	<10.0
Styrene	<10.0
Toluene	<10.0
Xylenes	<10.0

SEMIVOLATILE ACID-
EXTRACTABLE COMPOUNDS EPA METHOD # 8040
(values in mg/kg)

Benzenethiol	<10.0
Cresols	<10.0
2,4-Dimethylphenol	<10.0
2,4-Dinitrophenol	<10.0
4-Nitrophenol	<10.0
Phenol	<10.0

SEMIVOLATILES BASE/NEUTRAL
EXTRACTABLE COMPOUNDS EPA METHOD # 8270
(values in mg/kg)

Anthracene	<10.0
Benzo(a) anthracene	<10.0
Benzo(b) fluoranthene	<10.0
Benzo(k) fluoranthene	<10.0
Benzo(a) pyrene	<10.0
Bis(2,ethylhexyl) phthalate	<10.0
Butyl benzyl phthalate	<10.0
Chrysene	<10.0
Dibenz(a,h) acridine	<10.0
Dibenz(a,h) anthracene	<10.0
Dichlorobenzenes	<10.0
Diethyl phthalate	<10.0
7,12-Dimethylbenz(a) anthracene	<10.0
Dimethyl phthalate	<10.0
Di(n) butyl phthalate	<10.0
Di(n) octyl phthalate	<10.0
Fluoranthene	<10.0
Indene	<10.0
Methyl chrysene	<10.0
1-Methyl Naphthalene	<10.0
Naphthalene	<10.0
Phenanthrene	<10.0
Pyrene	<10.0
Pyridine	<10.0
Quinoline	<10.0

[illegible] Bennett for Gerald Roehrig
Gerald R. Roehrig, Ph.D.
Director, Science & Technology

COMMENT NUMBER: 4-D-7

DOCKET NUMBER: LD12-00212

COMMENTER: ITEX SERVICES, INC.

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Sulfide Treatment Standard

RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA appreciates the additional data and efforts by this commenter and believes that the stabilization process of insoluble sulfide salts used by this commenter is an applicable treatment technology that could be used to remove the reactive characteristic of D003 sulfide wastes. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-8
Docket Number: LD12-00249
Commenter: Exxon Chemical Company
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: — Sulfide Treatment Alternatives

I. INTRODUCTION

Exxon Chemical Company ("Exxon") and Rio Linda Chemical Company ("Rio Linda") working under a joint development agreement, have developed, field tested, and put into commercial use a technology that generates a very pure, chlorine-free stream of chlorine dioxide gas. Because it is essentially free of elemental chlorine, this ClO_2 stream does not form harmful byproducts and is ideally suited in terms of quality to a wide range of industrial, pesticidal, and waste treatment uses. It is also more cost effective than any competing alternative of comparable quality.

In particular, the Exxon/Rio Linda technology is ideally suited to serve as "Best Demonstrated Available Technology" ("BDAT") for all D003 reactive sulfides and the organic-sulfur compounds listed at 54 Fed. Reg. 48417. The reasons are set out in detail below.

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Comment Number: 4-D-8 (continued)
Docket Number: LD12-00249
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: Sulfide Treatment Alternatives
Comment:

II. DISCUSSION

A. The Exxon Process

1. The Basic Chemistry

The chemical mechanism of the Exxon/Rio Linda process is well known and documented. In each of its applications, it works by exposing the substance to be treated to a strong oxidizing solution of chlorine dioxide. Since chlorine dioxide can donate four electrons in an oxidation-reduction reaction, it is a more potent oxidizer than other members of the chlorine family such as hypochlorite (one electron), chlorine gas (two electrons), or chlorite (three electrons).

Chlorine dioxide also has advantages over oxidizing agents outside the chlorine family that might possibly perform the same function. It is a more potent oxidizer than such competing products as hydrogen peroxide or a mixture of sulfur dioxide with air. Other oxides of comparable potency are much more difficult, risky or expensive to handle than chlorine dioxide. These include ozone, permanganate, hydrazine, or liquid oxygen.

Comment Number: 4-D-B (continued)
Docket Number: LD12-00249
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: — Sulfide Treatment Alternatives

2. The Exxon/Rio Linda Process

The system used by Exxon/Rio Linda to generate chlorine dioxide is unique both in generating a very pure quality of chlorine dioxide and in its economic advantages.

The patented generation system was illustrated in our test data submission. It works by mixing feedstock chemicals to generate a solution of chlorine dioxide in water. The unique design of the system makes it inherently safe. The process of mixing the chemicals is governed by an eductor. The chemicals are vacuum fed into the reaction chamber by the action of a stream of water passing through the eductor. The quantity of chemicals reacted is proportioned to the quantity of water in the flow. In consequence, the amount of chlorine dioxide generated does not exceed the capacity of the stream of water to absorb it. In particular, unstable quantities (greater than 11%) of chlorine dioxide gas cannot be formed. No reaction can take place in the absence of a stream of water, since without that stream the eductor cannot function. There has never been a safety incident with the Exxon/Rio Linda process.

Comment Number: 4-D-8 (continued.)
Docket Number: LD 12-00249.
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: Sulfide Treatment Alternatives

The chlorine dioxide generated is free from chlorine up to the resolution limits of applicable test methods.

Because the chlorine dioxide generated is very pure, the Exxon/Rio Linda process has a great advantage for waste treatment applications over other commercial chlorine dioxide generating technologies, which generate chlorine as a byproduct. Those technologies tend to create new wastes at the same time that they destroy old ones. For example, phenols react with chlorine to form chlorophenols. Chlorine dioxide is free from that effect because it reacts in a direct oxidation rather than by substitution. Inefficiency in generating chlorine dioxide also results in a loss in oxidation efficiency of the product.

In addition, the proprietary features of the Exxon/Rio Linda technology make it highly competitive economically. We are confident that our technology can perform any given oxidizing function at a major cost advantage over competing approaches. One reason (not the only one) is the greater oxidizing efficiency of chlorine dioxide compared to competing approaches.

Moreover, the Exxon/Rio Linda technology can destroy a large range of reactive sulfides, including mercaptan sulfides, without either the environmental dangers or the special need for emission controls that accompany incineration.

Comment Number: 4-D-8 (continued)
Docket Number: LD12-00249.
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: — Sulfide Treatment Alternatives
Comment:

B. Test Data

1. General Uses

The basic principle of the Rio Linda/Exxon technology is well established and is not controversial. Units that use this process of generating chlorine dioxide on a commercial scale have been built and have been in operation for a number of years.

Over 500 Exxon/Rio Linda chlorine dioxide installations are in service world wide in such applications as oil field well stimulation and waterflood, drinking water treatment, food processing plant sanitation, medical instrument sterilization, pulp and paper bleaching, and chemical process oxidation, as well as waste and wastewater treatment.

Comment Number: 4-D-8 (continued)
Docket Number: LD12- 00249
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —
Comment: Sulfide Treatment Alternatives

2. Sulfide Treatment

a. General

The same oxidizing potential that has made the Rio Linda/Exxon technology useful in other applications has also made it useful in treating sulfides.

The basic chemistry of the reaction would lead us to expect very high destruction efficiencies for these wastes. A wide range of hazardous constituents can be oxidized concurrently by treatment with chlorine dioxide. Some hazardous compounds that cannot be remediated with competing technologies - in particular, mercaptan sulfides - can be destroyed by the Exxon/Rio Linda methods. Additionally, treatment efficiency can be increased easily and at an economical cost, by passing the waste through the treatment system more than once.

b. Full Scale Test Data

The Exxon/Rio Linda process has been proven in full scale treatment of sulfide wastes.

That data was submitted to the docket two weeks ago as requested in the Notice of Proposed Rulemaking. The submission also demonstrated that Exxon has validated a test method that can be used to quantify the amount of reactive organic sulfides present in a waste, and thus to provide an objective measure of the effectiveness of BDAT treatment.

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Comment Number: 4-D-8 (continued)
Docket Number: LD12-00249.
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: —Sulfide Treatment Alternatives

C. The Exxon/Rio Linda Technology is BDAT

In the proposal under consideration, EPA has addressed the establishment of BDAT standards for some nineteen reactive sulfide wastes. It has divided each of those wastes into a "non-wastewater" component and a "wastewater" component. A "wastewater" is an aqueous form of the wastes that contains less than 1% solids.

Under general EPA policy, which the proposal reflects, a treatment technology is "BDAT" if: (1) it has been "demonstrated" in full scale use of a well designed and operated system, either on a waste stream for which standards are being set, or on some other waste stream which is at least as hard to treat; (2) data from those tests has been collected that meet applicable QA/QC procedures; (3) those tests show that the destruction efficiency of the process, as measured by statistical adjustment of the test results, is equal to or exceeds the destruction efficiency of any other candidate process; and (4) the technology is "available."

Comment Number: 4-D-8 (continued)
Docket Number: LD12-00249.
Commenter: Exxon
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: — Sulfide Treatment Alternatives

All these conditions are met here. We have shown above that the Exxon/Rio Linda process is both "demonstrated" and "well designed and operated", and have provided data from full scale applications that meet governing EPA requirements.

Those data were collected on a sulfide solution that is at least as hard to treat as any sulfide waste for which EPA has proposed treatment standards.

Finally, the Exxon/Rio Linda technology is "available." Exxon/Rio Linda will make it freely available on a commercial basis to any qualified purchaser.

COMMENT NUMBER: 4-D-8
DOCKET NUMBER: LD12-00249
COMMENTER: EXXON Chemical Company
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

EPA believes that the chemical oxidation process described by this commenter is an applicable treatment technology that could be used to remove the reactive characteristic of D003 sulfide wastes. Chemical oxidation is included as a technology in the treatment standard. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-9
Docket Number: LD12-L0034
Commenter: HWTC
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: — Sulfide Treatment Alternatives

D. Comments Pertaining To Data On Treatment Of Reactive Sulfide Subcategory For D003 Wastes

ITEX's submittal describing their test results on treatment of refinery wastes containing high levels of reactive sulfides by their proprietary stabilization/solidification process does not demonstrate that organosulfides are converted to insoluble metal sulfide in the solidified product. It is difficult to imagine that stable organosulfides would react with heavy metals at the stated pH condition of the ARCHON™ treatment process (i.e., pH 10 to 12). A better explanation might be that the organosulfides continue to exist in the solidified treatment product and these break down to form reactive sulfide (i.e., H2S) during the sulfuric acid titration test for sample reactivity. Under these conditions, the test apparatus is the reactor where metals (either initially present in the waste or supplied in high concentration as constituents of the treatment additives) react with the sulfide ion (either by precipitation or by complex ion formation) to restrict the generation of H2S in the vessel headspace to less than 2.5 ppm.

If this is the case then what would be the fate of the untreated organosulfides, (contained in the solidified product) in the environment due to the effects of neutral and alkaline leaching waters on the material? Will the organosulfides remain as part of the solid phase or will they leach out and migrate with the water phase? [The treatment method provides no assurance against the latter.]

Exxon Chemical Company's submittal appears to show that chlorine dioxide is an effective, and practical means of treating moderate concentrations of organic sulfide (up to 35 mg/L) in wastewater streams.

Exxon's submittal states that most of the organic sulfide in the tested wastewater streams is present as mercaptans and these are readily oxidized by chlorine dioxide to yield sulfate. However, they also indicate that many petroleum distillate compounds such as acetone, benzene and toluene do not react with chlorine dioxide. This leaves the reader with the question of what is the fate of the organic portion of the mercaptan molecules and what are the reaction products left in the treated wastewater stream? Does the effluent from the organic sulfide treatment discharge directly to a POTW or are there further treatment steps required to remove organic solvents and residuals prior to further discharge?

Comment Number: 4-D-9 (continued)
Docket Number: LD12 - L0034
Commenter: HWTC
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: containing reactive listing constituents
Comment: Sulfide Treatment alternatives

In general, the HWTC is also concerned that these technologies for reactive sulfide are claimed confidential, and therefore not available, and may preclude certain more effective technologies that are proven and available for sulfide waste if selected as BDAT by EPA. Incineration is proven and available for organo-sulfur waste, and inorganic reactive sulfide waste can be treated using conventional wastewater treatment oxidation methodologies, as well as by reuse as a raw material to stabilize/precipitate toxic metals.

The treatment standard for reactive sulfide should therefore be amended as follows:

BDAT Treatment Standard For D003 Reactive Sulfide 261.23 (a)(5)
Chemical or Thermal Oxidation, or Precipitation of the Sulfide

Comment Number: 4-D-9 (continued)
Docket Number: LD12-L0034
Commenter: AWTC
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: Sulfide Treatment Alternatives

We believe that the "Oxidation/Precipitation" standard will provide the needed flexibility in providing treatment for this subcategory of reactive wastes, because it will allow the generator and treater to select - on the basis of the waste's unique characteristic - a treatment method which most effectively reduces the potential for sulfide gas generation.

Our review of the docket [relating to the Agency's solicitation for comments and data on the Third Third proposed rule] clearly indicates that it is unnecessary to require the precipitation of insoluble sulfates for treating wastes of this nature. In fact, the docket substantiates that it is feasible to treat organic-and mercaptan-bearing wastes effectively.

The "Oxidation/Precipitation" treatment standard would also provide for the use of reactive sulfide wastes in the treatment of metal-bearing wastes. The use of reactive sulfides in treating such wastes results in the precipitation of metals as metal sulfides. By contrast the treatment of metal-bearing wastes with hydroxide reagents results in a treatment residual that is orders of magnitude more soluble than any metal sulfide.

We believe that specifying "Oxidation/Precipitation" for reactive sulfides in analogous to establishing "Deactivation" as the treatment standard for D003 explosives, water reactives and other reactives, in as much as the Agency has not approved a standard analytical method for determining a quantitative threshold for these wastes in either their raw or treated forms. At such time that EPA establishes an analytical method for testing either sulfides or reactive sulfides in hazardous waste, the regulated community would then certainly be required to test both raw and treated wastes in accordance with the Agency's analytical procedure. Consequently, a reactive sulfide waste [that has been treated] would remain a D003 reactive sulfide until it "passes the test" as established by the procedure.

Hence, "Oxidation/Precipitation" as a treatment standard for reactive sulfide 261.23 (a)(5) would be an effective standard for these reasons:

- It provides the greatest flexibility in determining an appropriate treatment method to account for the unique nature of reactive sulfide wastes;
- It provides for the use of reactive sulfides wastes in treating a variety of metal-bearing wastes, while yielding an insoluble treatment residue;
- It advances the Agency's goals-both present and future and it presents no conflict with the implementation of a quantitative analytical method that would be used in determining a reactive sulfide threshold.

COMMENT NUMBER:	4-D-9
DOCKET NUMBER:	LD12-L0034
COMMENTER:	Hazardous Waste Treatment Council
ISSUE:	D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:	Sulfide Treatment Standard
RESPONSE:	

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory.

Since the commenter pointed out that some technologies may work well to treat some wastes but not others, the Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-10

Docket Number: LD12-L0035

Commenter: American Paper Institute

Issue: Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents

Subissue: Sulfide Treatment Alternatives

Comment:

These comments focus on material submitted by Exxon Chemical Company pertaining to a chemical oxidizer marketed by Exxon to scavenge sulfidic material from process wastewater. (Docket Document No. LD12-00056). In particular, we address Exxon's statements that (1) its data "sho[w] that the treatment method in question is a strong contender for selection as BDAT for organo sulfur and reactive sulfide wastes," and (2) that Exxon's "test program has also validated a test method for measuring reactive sulfides." Exxon comments at 1.[1]

With respect to the former statement, API/NFPA note that even if Exxon's product does what Exxon says it does, the product is useful only with respect to process wastewaters. EPA should not consider selecting Exxon's product as BDAT for non-wastewater sulfide-bearing wastes. In addition, we object to Exxon's statement that the treatment method it markets "is a strong contender for selection as BDAT" to the extent that Exxon intends that statement to mean the method should be the only approved chemical oxidation BDAT technique. API/NFPA continue to support EPA's statement that "the Agency does not want to specifically preclude the use of any particular oxidant." 54 Fed. Reg. 48425, col. 3. Even if Exxon's product is useful, it should merely take its place as one of the various chemical oxidation techniques available for treating reactive sulfides in wastewater. It should not be designated as the sole BDAT for such wastewater.

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[1] The technical aspects of these comments were prepared by the National Council of the Paper industry for Air and Stream Improvement, Inc. ("NCASI"). NCASI is an independent research organization that addresses the scientific aspects of environmental and manufacturing issues that affect the forest products industry.

Comment Number: 4-D-10 (continued)
Docket Number: LD12-00035
Commenter: American Paper Institute
Issue: Characteristic Reactive Wastes and P and U Wastes
Subissue: containing reactive listing constituents
Comment: Sulfide treatment alternatives

As to Exxon's second point, its broad claim that it has "validated a test method for measuring reactive sulfides" is not supported by the data submitted by Exxon. Exxon has proffered a Los Angeles County Sanitation District colorimetric test procedure which is based on ASTM D2913-70T, a test method for measuring the mercaptan content of air. This method suffers from at least two deficiencies relative to Exxon's apparent claim that this method may be used universally for measuring reactive sulfides. First, this method has not been tested for positive interferences in matrices where it might be applied. Second, this test method does not measure the forms of potentially reactive sulfide which might be present in wastes other than those originating in petrochemical refineries.

Exxon's procedure was tested only with refinery waste and only "recovery-of-addition" studies were used to assess interference. Exxon's validation studies do not address the possibility that there may be substances in non-refinery wastes which are not reactive sulfides, but which will form light absorbing species when contacted with the color forming reagent used in this method, thus yielding false results. In addition, successful completion of "recovery-of-addition" tests does not rule out the possible presence of additive positive interferences in waste matrices examined.

Moreover, non-refinery sulfur-bearing wastes may contain sulfide as free sulfide ($S^{=}$) or hydrosulfide (HS^{-}), and any procedure employed to measure potentially reactive sulfide in such wastes must respond to these substances. The "total mercaptan procedure" proffered by Exxon does not respond to free sulfide, hydrosulfide, or hydrogen sulfide. Thus, Exxon's claim that it has "validated a test method for measuring reactive sulfides" is, at best, limited to wastewaters originating in petrochemical refineries.

API/NFPA appreciate the opportunity to submit these comments on the foregoing information submitted during the Third Third Land Disposal Restriction Rulemaking. We would be pleased to submit additional information or respond to whatever questions the Agency may have concerning these comments.

COMMENT NUMBER: 4-D-10
DOCKET NUMBER: LD12-L0035
COMMENTER: American Paper Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Sulfide Treatment Standard
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste.

In response to this comment, the Agency is not distinguishing between waste types. Regardless of the physical characteristics of the waste, the treatment standard is considered met if the selected treatment technology removes the reactive characteristic of the specific waste. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-11
Docket Number: LD12 - L0031
Commenter: Thermal KEM / CyanoKEM
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: — Sulfide Treatment Alternatives
Comment:

B. Comments Pertaining to Data on Treatment of Reactive Sulfide Subcategory for D003 Wastes

ITEX's submittal describing their test results on treatment of refinery wastes containing high levels of reactive sulfides by their proprietary stabilization/solidification process does not demonstrate that organosulfides are converted to insoluble metal sulfide in the solidified product. It is difficult to imagine that stable organosulfides would react with metals at the stated pH condition of the ARCHON$_{\text{TM}}$ treatment process (i.e., pH 10 to 12). A better explanation might be that the organosulfides continue to exist in the solidified treatment product and these break down to form reactive sulfide (i.e., H2S) during the sulfuric acid titration test for sample reactivity. Under these conditions, the test apparatus is the reactor where metals (either initially present in the waste or supplied in high concentration as constituents of the treatment additives) react with the sulfide ion (either by precipitation or by complex ion formation) to restrict the generation of H2S in the vessel headspace to less than 2.5 ppm.

If this is the case then what would be the fate of the untreated organosulfides, (contained in the solidified product) in the environment due to the effects of neutral and alkaline leaching waters on the material? Will the organosulfides remain as part of the solid phase or will they leach out and migrate with the water phase?

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Comment Number: 4-D-11 (continued)
Docket Number: LD12-L0031
Commenter: Thermal KEM/CyanoKEM
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —
Comment: Sulfide Treatment alternatives

Exxon Chemical Company's submittal appears to show that chlorine dioxide is an effective, and practical means of treating moderate concentrations of organic sulfide (up to 35 mg/L) in wastewater streams.

Exxon's submittal states that most of the organic sulfide in the tested wastewater streams is present as mercaptans and these are readily oxidized by chlorine dioxide to yield sulfate. However, they also indicate that many petroleum distillate compounds such as acetone, benzene and toluene do not react with chlorine dioxide. This leaves the reader with the question of what is the fate of the organic portion of the mercaptan molecules and what are the reaction products left in the treated wastewater stream? Does the effluent from the organic sulfide treatment discharge directly to a POTW or are there further treatment steps required to remove organic solvents and residuals prior to final discharge?

In general, we are also concerned that these technologies for reactive sulfide are claimed confidential, and therefore not available, and may preclude certain more effective technologies that are proven and available for sulfide waste if selected as BDAT by EPA. Incineration is proven and available for organo-sulfur waste, and inorganic reactive sulfide waste can be treated using conventional wastewater treatment oxidation methodologies, as well as by beneficial reuse as a raw material to stabilize/precipitate toxic metals.

The treatment standard for reactive sulfide should therefore be amended as follows:

BDAT Treatment Standard for D003
Reactive Sulfide 261.23(a)(5)

Deactivation as a method of Treatment

COMMENT NUMBER: 4-D-11

DOCKET NUMBER: LD12-L0031

COMMENTER: ThermalKEM/CyanoKEM

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Sulfide Treatment Standard

RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for the D003-reactive sulfides subcategory. The Agency has established this general standard to allow the regulated community the flexibility to use the "best" technology for the specific sulfide waste since, as the commenter point out, some technologies may work well to treat some wastes, but not others. See 40 CFR 268 Appendix VI for a list of additional applicable technologies that, used alone or in combination, can achieve this standard.

Comment Number: 4-D-12
Docket Number: L010-00042
Commenter: API
Issue: D003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Sulfide Treatment Alternatives

2. Problems with Potential Treatment Standards for D003 (Reactive Sulfides) Wastes

EPA is only in the beginning stages of its consideration of possible treatment standards for reactive sulfide wastes (D003) and has requested any waste characterization or treatment data that might be useful.[13] API recognizes that EPA is still in the

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[13] API plans to prepare additional technical data on this subject and expects to submit such data to EPA in the near future. However, until EPA adopts a final characteristics test for reactive wastes, API will be constrained in its ability to develop the information requested. API is willing to cooperate with EPA in developing a final test and other technical data. (Of course, any wastes ultimately identified as hazardous by virtue of such a new test would be considered "newly identified" wastes, as discussed earlier in these comments.)

Comment Number: 4-D-12 (continued)
Docket Number: L012-00042
Commenter: API
Issue: 0003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Sulfide Treatment Alternatives

process of developing a final characteristic test for these wastes, although it has distributed an interim draft test. See Memorandum from Eileen Claussen, EPA, to Regional Solid Waste Branch Chiefs, July 12, 1986.

API believes that a "catch-22" problem could develop for reactive wastes if the characteristic test ultimately adopted for reactive solids requires adjustment of the pH of the waste to a pH of 2. (API understands that EPA is considering such a modification of its interim draft test for such wastes.) At such a low pH, sulfide-containing wastes can generate the reactive gas, hydrogen sulfide (H_2S). A logical treatment would be to buffer the waste to prevent the occurrence of a low pH. The problem, however, is that if the testing procedure calls for adjusting the pH to 2 (regardless of the amount of acid addition necessary to do so), the environment for H_2S evolution is reestablished, no matter how well the waste has been buffered.

The alternative, of course, is to require destruction of the "sulfide" source or conversion to some non-reversible sulfate or the like. This will likely be a difficult task for sulfide bearing sludges or spent catalysts.

COMMENT NUMBER: 4-D-12

DOCKET NUMBER: LD10-00042

COMMENTER: API

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Sulfide Treatment Standard

RESPONSE:

The Agency is promulgating "deactivation to remove the characteristic of reactivity" for wastes in the D003 sulfide subcategory. EPA agrees with the commenter that a characteristic test method needs to be standardized before establishing a number based on the test method. EPA is not resolving any issues relating to when sulfide-bearing wastes are hazardous in this proceeding. We summarize existing Agency guidance below:

Currently the accepted method for quantitatively determining reactive sulfides as outlined in SW-846, Vol. 1C, Section 7.3.3.2 and in Method 9030 allows too much variability. In the interim, the Agency has instituted a technology-based BDAT treatment standard and is using the threshold of 500 mg of H_2S/kg as guidance until a test method is standardized for accurate reactive sulfide determinations.

COMMENT NUMBER: 4-E-1 ✓

DOCKET NUMBER: LD12-00098

COMMENTER: B P America Inc

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Proposed insoluble Salt Requirement for Sulfides

VI. EPA should not require the precipitation of insoluble sulfates for Reactive Sulfide Wastes (D003).

EPA's proposed standard for wastes that are hazardous because they contain reactive sulfides is alkaline chlorination or chemical oxidation followed by precipitation of insoluble sulfates (54 FR 48425). EPA should not require precipitation of insoluble sulfates. Since sulfates are regulated by the secondary drinking water standard (40 CFR Part 143), and since the drinking water standards for sulfates provide ample protection of aquatic ecosystems, there is no need for additional regulation.

Some spent catalysts from petroleum refining may exhibit the reactive sulfide characteristic. These catalysts may be treated by thermal processing. Much of the sulfide is converted to sulfate and binds with metals present in the catalyst, while some is converted to sulfur oxide.

EPA is urged to remove the requirement for "followed by precipitation to an insoluble sulfate" from the BDAT standard for sulfide reactive wastes. Application of an additional treatment step to the catalyst treatment system would be expensive and result in minimal environmental benefit. Most of the sulfide is converted to sulfate in the first step. Conversion of sulfur oxide to sulfate is inappropriate as sulfur oxide is already a regulated air pollutant.

The BDAT standard should replace "incineration" with "thermal treatment" to allow generators additional flexibility to select a treatment process in which sulfides are more readily converted to sulfates than to sulfur oxides.

Sulfate removal prior to deepwell injection is not necessary because sulfates are naturally occurring in deep subsurface formations. Formations acceptable as injection zones must contain interstitial waters having a total dissolved solids concentration greater than 10,000 mg/l. These interstitial waters include sulfates as a major accessory component (Evaluation of Underground Injection of Industrial Waste in Illinois, 1989, Illinois Scientific Surveys Joint Report 2).

COMMENT NUMBER: 4-E-1
DOCKET NUMBER: LD12-00098
COMMENTER: BP America Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Proposed Insoluble Salt Requirement for Sulfides
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-reactive sulfide wastes because of the diversity of treatment technologies applicable to D003-sulfide wastes. EPA recognizes that the insoluble salt requirement will cause disruptions and even effect the optimum efficiency of some treatment systems. For instance, if insoluble sulfate salts must be formed before biological treatment, organic constituents that could have been destroyed are instead being transferrrred to the solid phase where they will either be disposed of untreated or where they may require treatment with incineration. Additionally, EPA notes that the insoluble sulfate requirement would have limited the use of organic-free reactive sulfide wastes as precipitating reagents used for metals treatment since this process would produce insoluble metal sulfide precipitates.

EPA believes that the promulgated standard gives the regulated community the flexibility to select the technology best suited to treat a particular waste stream. A list of applicable technologies that, when used alone or in combination, can achieve this standard is included in 40 CFR 268 Appendix VI.

The Agency is not specifying that sulfate removal be accomplished prior to deepwell injection in this rule.

Comment Number: 4-E-2
Docket Number: LD12-00168.
Commenter: American Petroleum Institute
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: - Proposed Insoluble Salt Requirements for Sulfides

III. A.4.d.(2) - Reactive Characteristic Wastes; Reactive Sulfides Subcategory

The Agency proposes to use the interim guideline of 500 mg H2S generated per kilogram of waste for determining which wastes are required to be treated by "alkaline chlorination chemical oxidation, or incineration followed by precipitation to insoluble sulfates." However, the Agency invites commenters to propose a concentration-based standard.

Treatment of reactive sulfide wastes by the methods described by EPA is common, but the treatment does not normally include precipitation of the sulfate salts as insoluble sulfates. Again, such a requirement would be unwise, for the reasons given above in the discussion of corrosive characteristic wastes.

COMMENT NUMBER: 4-E-2
DOCKET NUMBER: LD12-00168
COMMENTER: American Petroleum Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Proposed Insoluble Salt Requirement for Sulfides
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-reactive sulfide wastes because of the diversity of treatment technologies applicable to D003-sulfide wastes. EPA recognizes that the insoluble salt requirement will cause disruptions and even effect the optimum efficiency of some treatment systems. For instance, if insoluble sulfate salts must be formed before biological treatment, organic constituents that could have been destroyed are instead being transferrred to the solid phase where they will either be disposed of untreated or where they may require treatment with incineration. Additionally, EPA notes that the insoluble sulfate requirement would have limited the use of organic-free reactive sulfide wastes as precipitating reagents used for metals treatment since this process would produce insoluble metal sulfide precipitates.

EPA believes that the promulgated standard gives the regulated community the flexibility to select the technology best suited to treat a particular waste stream. A list of applicable technologies that, when used alone or in combination, can achieve this standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-E-3
Docket Number: LD12-00184
Commenter: Lubrizol Corporation
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes containing reactive listing constituents
Comment: Proposed Insoluble Salt Requirement for Sulfides

II. EPA's Proposed Treatment Standard For Reactive Sulfide Wastes Includes An Unnecessary Step.

The Agency has proposed alternative required methods of treatment for reactive sulfide D003 wastes. These methods are alkaline chlorination, chemical oxidation or incineration followed by precipitation to insoluble sulfates. Lubrizol believes that with respect to incineration of reactive sulfides the subsequent precipitation of the treatment residue is unnecessary because no reactive sulfides would remain in the waste. Incineration would transform the reactive sulfides into sulfur oxides. Accordingly, EPA should not require precipitation after incineration because the moiety causing the reactivity, i.e. sulfide, should no longer exist. Moreover, any waste residue from such treatment would have to be evaluated and, if a hazardous waste, would be subject to its own treatment standard.

COMMENT NUMBER: 4-E-3

DOCKET NUMBER: LD12-00184

COMMENTER: Lubrizol Corporation

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Proposed Insoluble Salt Requirement for Sulfides

RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-reactive sulfide wastes because of the diversity of treatment technologies applicable to D003-sulfide wastes. EPA recognizes that the insoluble salt requirement will cause disruptions and even effect the optimum efficiency of some treatment systems. For instance, if insoluble sulfate salts must be formed before biological treatment, organic constituents that could have been destroyed are instead being transferrred to the solid phase where they will either be disposed of untreated or where they may require treatment with incineration. Additionally, EPA notes that the insoluble sulfate requirement would have limited the use of organic-free reactive sulfide wastes as precipitating reagents used for metals treatment since this process would produce insoluble metal sulfide precipitates.

EPA believes that the promulgated standard gives the regulated community the flexibility to select the technology best suited to treat a particular waste stream. A list of applicable technologies that, when used alone or in combination, can achieve this standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-E-4
Docket Number: LD12-00243
Commenter: NCASI
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: — Proposed Insoluble Salt Requirement for Sulfide

(4) BDAT for reactive sulfide wastes is unnecessarily restrictive in its requirement for the generation of insoluble salts. It is appropriate, however, that the rule not specify or limit the chemical oxidants used in sulfide oxidation.

The proposed treatment standard for reactive sulfide wastes is based, in part, on oxidation of sulfide to sulfate and precipitation to insoluble sulfate salts.

With regard to the requirement that the sulfates be precipitated as insoluble salts, our comments on this topic relative to treatment standards for pH corrosive wastes are equally relevant here. To summarize the relevant portion of those comments; it may not always be desirable to form insoluble salts. This requirement should be removed and the opportunity allowed to determine on a site-specific basis the acceptability of the salts that are formed.

EPA has intentionally not limited the oxidants that can be used for sulfide oxidation. This is a technically reasonable position as the preferred oxidant can be expected to vary among wastes. This approach would also allow the use of molecular oxygen or air for oxidizing sulfides, an approach that has found use in certain manufacturing processes related to pulp production.

COMMENT NUMBER: 4-E-4
DOCKET NUMBER: LD12-00243
COMMENTER: NCASI
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Proposed Insoluble Salt Requirement for Sulfides
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-reactive sulfide wastes because of the diversity of treatment technologies applicable to D003-sulfide wastes. EPA recognizes that the insoluble salt requirement will cause disruptions and even effect the optimum efficiency of some treatment systems. For instance, if insoluble sulfate salts must be formed before biological treatment, organic constituents that could have been destroyed are instead being transferrred to the solid phase where they will either be disposed of untreated or where they may require treatment with incineration. Additionally, EPA notes that the insoluble sulfate requirement would have limited the use of organic-free reactive sulfide wastes as precipitating reagents used for metals treatment since this process would produce insoluble metal sulfide precipitates.

EPA believes that the promulgated standard gives the regulated community the flexibility to select the technology best suited to treat a particular waste stream. A list of applicable technologies that, when used alone or in combination, can achieve this standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-E-5
Docket Number: LD12-L0007
Commenter: CMA
Issue: D003: Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing reactive listing constituents
Comment: Proposed Insoluble Salt Requirement for Sulfides

L. The Proposed Standards for Reactive Sulfide Wastes (D003) Include Precipitation to Form Insoluble Sulfates. This Treatment Step Is Unnecessary, and Environmentally Counterproductive for Many Sulfide-Containing Wastes.

EPA's proposed standard for wastes that are hazardous because they contain reactive sulfides is alkaline chlorination or chemical oxidation followed by precipitation of insoluble sulfides. 54 Fed. Reg. at 48,425.

CMA has already addressed the inappropriateness of precipitating sulfate salts in its comments on neutralization of acid and alkaline D002 wastes. There is no adequate environmental or resource recovery justification for the precipitation of sulfates. There are, however, good environmental and technical reasons for *not* requiring the formation of insoluble precipitates when it is not absolutely necessary. The most important reason is that EPA's proposal will result in the formation of solid wastes that most often will require land disposal and that may contain hazardous constituents that could have been more completely and cost-effectively removed from the liquid phase by normal wastewater treatment technology.

~~Comment Number:~~ 4-E-5 (continued)
~~Docket Number:~~ LD12-L0007
~~Commenter:~~ CMA
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —
~~Comment:~~ Proposed Insoluble Salt Requirement for Sulfides

EPA should eliminate "precipitation of insoluble sulfates" from the treatment designation for reactive sulfide D003 wastes. The Agency should also remove "precipitation of insoluble salts" from the treatment standards for P006, P096, P105, P122, U135, U139, and U249 wastewaters. The rationale for not requiring precipitation of insoluble salts is identical to that for the acidic, alkaline, and sulfide-bearing characteristic wastes. CMA again reminds EPA that if soluble sulfate or phosphate salts in the wastewaters resulting from treatment are a potential environmental problem, they will be controlled by an NPDES permit issued under the authority of the CWA.

COMMENT NUMBER: 4-E-5
DOCKET NUMBER: LD12-L0007
COMMENTER: CMA
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Proposed Insoluble Salt Requirement for Sulfides
RESPONSE:

The Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-reactive sulfide wastes because of the diversity of treatment technologies applicable to D003-sulfide wastes. EPA recognizes that the insoluble salt requirement will cause disruptions and even effect the optimum efficiency of some treatment systems. For instance, if insoluble sulfate salts must be formed before biological treatment, organic constituents that could have been destroyed are instead being transferrred to the solid phase where they will either be disposed of untreated or where they may require treatment with incineration. Additionally, EPA notes that the insoluble sulfate requirement would have limited the use of organic-free reactive sulfide wastes as precipitating reagents used for metals treatment since this process would produce insoluble metal sulfide precipitates.

EPA believes that the promulgated standard gives the regulated community the flexibility to select the technology best suited to treat a particular waste stream. A list of applicable technologies that, when used alone or in combination, can achieve this standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-F-1
Docket Number: LD12-00146
Commenter: Leather Industries Research Laboratory
Issue: D003-Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing Reactive Listing Constituents
Comment: Reactive Sulfide Definition

B. Proposed Quantitative Threshold for Identification of D003 Reactive Sulfides Waste

The Agency, in proposing treatment standards for reactive characteristic wastes, has arbitrarily arrived at an interim quantitative threshold for D003 Reactive Sulfides of 500 mg. of H_2S per kg. of waste generated (54 FR 48425). The use of the 500 mg/kg figure is an attempt by the Agency to incorporate a standard based on fundamentally flawed methodology without technical or legal justification. LIA participated in the Agency's Toxic Gas Generation Reactivity Group that met from early 1986 through April 1987. The specific purpose of that coalition was to develop an acceptable and practical reactivity protocol. During these meetings the Agency presented substantially the same 500 mg/kg H_2S threshold and accompanying protocol proposed in this rule making. As discussed below in further detail, LIA, along with other coalition members, conclusively demonstrated that the reactivity protocol was devoid of any meaningful application and that a 500 mg/kg threshold was completely unrealistic as a viable threshold level. On receiving these comments the Agency disbanded the coalition. Now the Agency is attempting to resurrect this faulty interim standard with full knowledge of the flawed methodology and is attempting to incorporate the same standard through a regulatory back door.

It is interesting to note that the reactivity background document on which the Agency bases its threshold determination (EPA document LD12-S0085 and LD12-S1031) contain no justification or explanation of the applicability of the reactivity protocol to real field testing scenarios. These documents demonstrate that the Agency has not established a just and proper foundation for proposing, even on an interim basis, a 500 mg/kg treatment standard for the D003 Reactive Sulfides.

The most disturbing aspect of the proposed interim threshold is its incorporation into the third-third proposal without any meaningful opportunity for public comment. The Agency has known of the deficiencies with the 500 mg/kg standard for over five years, yet it is providing the public with less than two months to submit meaningful data and comments on the proposed standard. This rulemaking is not the appropriate forum in which to adopt changes in the substance of the reactivity characteristic itself. Thus, EPA's attempt to modify the characteristic in this proceeding and to do so by adopting a technically invalid standard of 500 mg/kg is clearly arbitrary, capricious and without any legal basis.

The tanning industry utilizes sodium sulfide/sulfhydrate for hide and skin unhairing. Although effluent sulfide may be oxidized to meet categorical sulfide limits (40 CFR 425), such treatment is not required of direct dischargers and may not be required for certain indirect dischargers (40 CFR 425.04). Therefore, wastewater treatment sludge and recovered hair from the leather tanning process may contain significant quantities of residual sulfide. There is no evidence that disposal of either of these industry materials presents any danger to human health or the environment, so they are not presently considered hazardous under the RCRA Characteristic of Reactivity. Application of the proposed quantitative threshold would potentially impact both of these materials, and require them to be

COMMENT NUMBER: 4-F-1 continued

DOCKET NUMBER: LD12-00146

COMMENTER: Leather Industries Research Laboratory

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Reactive Sulfide Definition

treated prior to land application or disposal. We strongly oppose this action for the reasons presented below:

1. EPA has been unable to develop a quantitative definition for the RCRA Characteristic of Reactivity. Since 1985, and probably earlier, EPA has been working to develop a quantitative definition for the RCRA Characteristic of Reactivity along with an appropriate laboratory testing procedure. To date, this effort has been unsuccessful. An interim threshold guidance memorandum was issued by the Agency on July 12, 1985 (Exhibit A). This memorandum proposed an interim threshold of 500 mg of H_2S per kilogram of waste, and described the test method by which this was to be determined. The memorandum also indicated the Agency expected "to propose a quantitative threshold for toxic gas generation reactivity in December of this year" (1985). Such action has never been taken, so there has been no opportunity for public comment on the proposed threshold or laboratory methodology.

   In 1986, EPA created a Toxic Gas Generation Reactivity Discussion Group, which met initially on January 30, 1986, with some 20 industry, Agency, and contractor representatives. It was the intended purpose of this Group to provide input and assistance to the Agency and their contractor(s) in the development of a quantitative reactivity threshold and laboratory protocol. Leather Industries of America (LIA) was an active participant in this Discussion Group for the duration of its existence. On June 18, 1986, EPA announced a change in contractors from ERCO/ENSECO to Research Triangle Institute (RTI), and requested comments by the Discussion Group on the proposed RTI Work Plan. A copy of LIA comments dated September 10, 1986, is enclosed as Exhibit B and is hereby made a part of this comment document. A final meeting of the Discussion Group was held on April 27, 1987, at which it was announced that due to other priorities and limited resources the Agency was unwilling to consider the mismanagement scenario on which their proposed reactivity threshold was based. This action effectively frustrated the efforts of the Discussion Group, which has not met since that time.

   It is clear from this record EPA has had an extremely difficult time trying to develop an appropriate reactivity test method. Information has been provided which seriously challenges the Agency's methodology, but to date this appears to have been ignored. In contrast to their stated intent, the Agency has never initiated formal rulemaking procedures on this subject or otherwise provided any opportunity for public comment. Incorporation of an interim value into the Land Disposal Restrictions as proposed constitutes a change in the regulatory definition of Reactivity, which completely bypasses the rulemaking process. It is interesting to note the Agency is proposing to take such action only with regard to sulfide. The interim guidance memorandum issued in 1985 (Exhibit A) also proposes a threshold for cyanide of 250 mg/kg., which is not incorporated into the Land Disposal Restrictions. This is clearly inconsistent. We oppose use of this interim guidance threshold to identify wastes that must be treated in accordance with the proposed Land Disposal Restrictions.

COMMENT NUMBER: 4-F-1 continued
DOCKET NUMBER: LD12-00146
COMMENTER: Leather Industries Research Laboratory
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Reactive Sulfide Definition

2. The proposed threshold value of 500 mg/kg is totally without valid technical merit. It is the position of LIA that a sulfide reactivity threshold of 500 mg H_2S/kg waste when measured as described in Exhibit A has no valid technical basis and thus should not be used. Detailed comments in support of this position are given in Exhibit B. Major points are summarized briefly below.

   - The acid-pit disposal scenario on which the testing protocol is based is unrealistic. There is no documented evidence that such an event has ever or is ever likely to occur. We do not believe the potential for acid-pit disposal exists at tannery waste disposal sites, and it certainly bears no relevance to the landfill disposal or land application of tannery sludge.

   - Measurement of sulfide release from an agitated reactor vessel does not realistically simulate actual release under the assumed mismanagement conditions. Even if acid-pit disposal were possible, tannery sludge is a highly viscous cohesive material that would tend to remain essentially intact and retard the rate of acid penetration. Sulfide release potential would be substantially increased in an agitated vessel.

   - Measurement of total sulfide evolution rather than peak concentration is inappropriate. A cohesive waste material that would tend to disperse and react more slowly is clearly of less concern under the assumed mismanagement conditions than one that would disperse more readily. Therefore, test results should be based on rate of reaction (peak concentration) rather than on total gas evolution over time.

   - The mismanagement model assumes linear absorption of toxic gas over the entire pit width (15 meters). This assumption is also unrealistic, particularly with cohesive waste materials.

   - Model use of a chronic rather than an acute exposure threshold for H_2S is totally inappropriate.

   All of these factors taken together would increase the reactivity threshold for sulfides under the assumed mismanagement conditions by at least two orders of magnitude.

COMMENT NUMBER: 4-F-1
DOCKET NUMBER: LD12-00146
COMMENTER: Leather Industries Research Laboratories
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
RESPONSE:

EPA agrees with the commenter that the test method used in determining reactice sulfide needs to be standardized before establishing a numerical standard based on the test method. Until EPA can develop analytical methods capable of accurately determining quantitative characteristic hazards, industry must judiciously make qualitative technical decisions dependent on the waste definition. Treaters must complete treatment until qualitative technical judgement indicates that the waste or waste residual no longer exhibits the characteristic hazard specified by the definition. EPA is not identifying hazardous waste in this proceeding, and not otherwise amending the existing regulatory standard for reactive sulfides in this rule.

COMMENT NUMBER: 4-F-2
DOCKET NUMBER: LD12-00095
COMMENTER: American Paper Institute
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Reactive Sulfide Definition

III. EPA's Proposal to Use a 500 mg/kg Gas Generation Threshold to Identify the Wastes in the Reactive Sulfides Subcategory Does Not Accomplish EPA's Announced Purpose, Contradicts Existing EPA Rules, and is Not Supported By the Requisite Rulemaking Record.

EPA regulations provide that a sulfide-bearing solid waste exhibits the characteristic of reactivity if, "when exposed to pH conditions between 2 and 12.5, [it] can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment." 40 C.F.R. § 261.23(a)(5). The preamble to the Agency's Third Third rule states that the Agency is developing a numeric threshold for toxic gas generation from sulfide-bearing wastes to replace this narrative definition. 54 Fed. Reg. 48425. The preamble also states:

> The interim value the Agency is considering is 500 mg of H_2S generated per kilogram of waste. Although this number is only an interim guideline for the purpose of BDAT determinations the Agency is proposing to use this number to identify the wastes in this subcategory (given the need for an objective means of determining the subcategory's applicability).

Id. API/NFPA believe that EPA may not lawfully use 500 mg/kg as a "guideline for BDAT determinations" (whatever that may mean), or to "identify the wastes in this subcategory" and urge EPA to abandon this course of action for the following reasons.

COMMENT NUMBER: 4-F-2 continued
DOCKET NUMBER: LD12-00095
COMMENTER: American Paper Institute
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
COMMENT: First, the 500 mg/kg threshold is not useful for the purpose announced by EPA, that is, "to identify the wastes in this subcategory." EPA's present regulatory definition of reactivity for sulfide-bearing wastes is more than sufficient to tell the regulated community what wastes belong in the reactive sulfide subcategory and has successfully served this purpose for many years. Second, the proposed 500 mg/kg threshold does not simply identify wastes in the reactive sulfide category (as opposed to the reactive cyanide or explosives subcategories of D003 wastes), because there are no other subcategories within the D003 reactive characteristic waste group into which sulfide-bearing wastes would fit. EPA's use of this threshold is, therefore, tantamont to redefining the characteristic of reactivity. Third, this _de facto_ redefinition of reactivity for sulfide-bearing wastes is not supported by reasoned Agency decisionmaking or by documents in the administrative record underlying this rulemaking that satisfy the following EPA criteria for identifying the characteristics of hazardous wastes:

> (a) The Administrator shall identify and define a characteristic of hazardous waste . . . _only upon determining that_:
>
> (1) A solid waste that exhibits the characteristic may:
>
> (i) Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
>
> (ii) Pose a substantial present or potential hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed; and

COMMENT NUMBER: 4-F-2 continued
DOCKET NUMBER: LD12-00095
COMMENTER: American Paper Institute
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE Reactive Sulfide Definition
COMMENT:

(2) The characteristic can be:

(i) Measured by an available standardized test method which is reasonably within the capability of generators of solid waste or private sector laboratories that are available to serve generators of solid waste; or

(ii) Reasonably detected by generators of solid waste through their knowledge of their waste.

(emphasis added). EPA's de facto redefinition of reactivity for sulfide-bearing wastes does not satisfy these rules. First, neither the preamble to the Third Third rules nor the proposed rules themselves set out the Administrator's determination that sulfide-bearing wastes which exceed the 500 mg/kg toxic gas generation threshold may increase human mortality, serious irreversible or incapacitating reversible illness, or pose a substantial present or potential hazard to human health and the environment when such wastes are improperly managed. The preamble to this proposed rule and the administrative record are completely devoid of any such discussion, not to mention any factual, scientific, or medical basis for such a determination. Thus, the requirements of 40 C.F.R. § 261.10(a)(1)(i) and (ii) have not been satisfied.

Moreover, EPA has acknowledged in the preamble that it "has not approved a standard analytical method for testing either sulfides or 'reactive' sulfides in hazardous wastes or in treatment residues . . . ." 54 Fed. Reg. 48425/3. The BDAT Background Document for Characteristic Wastes candidly acknowledges that "there is no known

COMMENT NUMBER: 4-F-2 continued

DOCKET NUMBER: LD12-00095

COMMENTER: American Paper Institute

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Reactive Sulfide Definition

COMMENT:

analytical test designed to measure the reactivity for these [D003] wastes, nor is there a test that distinguishes the reactive chemical from the deactivated chemical . . . ." Proposed Best Demonstrated Available Technology (BDAT) Background Document for Characteristic Wastes ¶ 3.4 at 3-12 (November, 1989). Thus, EPA designation of a concentration-based regulatory threshold without a standardized test to measure such concentrations contravenes 40 C.F.R. § 261.10(a)(2)(i). In contrast, generators of sulfide-bearing waste are able to apply the "knowledge standard" set out in § 261.10(a)(2)(ii) to such wastes and make a reasoned judgment about whether the present narrative definition of reactivity applies to these wastes.

To sum up, EPA's proposal of a 500 mg/kg "number to identify the wastes in [the reactive sulfides subcategory]" would essentially superimpose a concentration-based characteristic test over the existing narrative test without meeting the criteria of § 261.10. In addition, EPA's failure to make the determinations required by § 261.10 and the Agency's failure to support its selection of the 500 mg/kg threshold with facts and reasoned analysis in the preamble and administrative record deny API/NFPA the opportunity for reasonable notice of the Agency's proposed regulatory action and an opportunity to comment on that action. Moreover, specification of a concentration-based sulfide reactivity threshold is not necessary.

COMMENT NUMBER: 4-F-2 Continued
DOCKET NUMBER: LD12-00095
COMMENTER: American Paper Institute
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Reactive Sulfide Definition

Forest products companies are able to apply the present narrative definition without difficulty. Finally, EPA's specification of this threshold, now, prejudges the Agency's pending process to develop such a threshold and the rulemaking that must follow. For all of these reasons, API/NFPA urge EPA to abandon the 500 mg/kg threshold.

COMMENT NUMBER: 4-F-2
DOCKET NUMBER: LD12-00095
COMMENTER: American Paper Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
RESPONSE:

EPA agrees with the commenter that the test method used in determining reactive sulfide needs to be standardized before establishing a numerical standard based on the test method. Until EPA can develop analytical methods capable of accurately determining quantitative characteristic hazards, industry must judiciously make qualitative technical decisions dependent on the waste definition. Treaters must complete treatment until qualitative technical judgement indicates that the waste or waste residual no longer exhibits the characteristic hazard specified by the definition.

EPA disagrees that use of the 500 mg/kg interim threshold to identify wastes in the reactive sulfide category is inappropriate and constitutes a redefinition of the characteristic of reactivity. First, EPA has used the 500 mg/kg limit as guidance for identifying D003 sulfides for several years (see SW-846 method 9030). In addition, in this rulemaking it is only being used as interim guidance to determine which wastes already determined to be D003 are subject to the reactive sulfide treatment standard. EPA is not issuing a Section 3001 rule in this proceeding as feared by the commenter.

COMMENT NUMBER: 4-F-3

DOCKET NUMBER: LD12-00163

COMMENTER: Courtaulds Fibers Inc.

ISSUE: D003 - Characteristic Reactive Wastes & P & U Wastes Containing Reactive Listing Constituents

SUBISSUE: Reactive Sulfide Definition

COMMENT:

Comments

CFI's remarks are limited to EPA's request for comment on proposed treatment standards for characteristic wastes in the reactive sulfides subcategory. See 54 Fed. Reg. 48425 (cols. 2-3). Characteristic wastes in this subcategory are sulfide-bearing wastes that generate toxic gases when exposed to a pH between 2 and 12.5 in quantities considered by EPA sufficient to present a threat to human health and the environment.

EPA has proposed to use the interim threshold of 500 mg of H_2S per kg for purposes of best demonstrated available technology ("BDAT") determinations. CFI strongly endorses EPA's proposal, and urges EPA to promulgate the interim threshold in the final rule.

EPA properly notes in the proposal that it is developing a quantitative threshold for toxic gas generated from reactive sulfide wastes. See id. at col. 3. CFI has been an active participant in this endeavor and has submitted to the Agency substantial data and comment on this issue. See, e.g., "Review of the U.S. EPA Draft Proposed Protocol to Define Reactive Waste Under the Resource Conservation and Recovery Act," prepared for CFI by Battelle Columbus Division (May 16, 1986).[1] In addition, CFI is a member of the Toxic Gas Generation Reactivity Discussion Group. This EPA-sponsored group meets periodically to discuss EPA's work on improving the current reactivity protocol.

As a result of these efforts, EPA issued "interim guidance" for testing reactive sulfide wastes and a threshold for gas generation. The interim value for sulfide is 500 mg of H_2S released per kilogram of waste. Although the threshold limit is interim, it represents the culmination of substantial review of the best data available by Agency and industry representatives most familiar with wastes in the reactive sulfide subcategory, and is thus technically sound. EPA should, therefore, promulgate the interim threshold for purposes of BDAT determinations in the final rule.

COMMENT NUMBER: 4-F-3

DOCKET NUMBER: LD12-00163

COMMENTER: Courtaulds Fibers Inc.

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Reactive Sulfide Definition

RESPONSE:

Issues related to new waste identification are beyond the scope of this proceeding.

COMMENT NUMBER: 4-F- 4

DOCKET NUMBER: LD12-00160

COMMENTER: American Iron and Steel Institute

ISSUE: D003 - Characteristic Reactive Wastes & P & U Wastes Containing Reactive Listing Constituents

SUBISSUE: Reactive Sulfide Definition

COMMENT:

Reactive Wastes

AISI is particularly concerned with the Agency's proposal to set specific quantitative treatment standards for wastes classified as D003 Reactive Cyanide wastes and to establish a required method of treatment, "Alkaline Chlorination, Chemical Oxidation, or Incineration Followed by Precipitation to Insoluble Sulfates" for D003 Reactive Sulfides wastes. Both of these wastes are defined only by a narrative description in 40 CFR Section 261.23(a)(5), and there is no quantitative threshold for toxic gases generated from reactive cyanides or sulfides. AISI is aware that the Agency has attempted to develop such quantitative thresholds. See, e.g., 54 Fed. Reg. at 48425. In fact, steel industry representatives have worked with EPA on the Toxic Gas Generation Reactivity Method Discussion Group attempting to develop such quantitative regulations. Nonetheless, promulgation of a test method is not even referenced in the current Regulatory Agenda.

Until quantitative thresholds are defined, it is not possible to identify wastes which might be classified as D003 Reactive Wastes for reactive cyanides or sulfides. In view of this uncertainty, AISI believes it would be improper to set a limit on total cyanide concentration in a waste or to specify a method of treatment for sulfides when such limitations or methods may be totally inappropriate, considering the physical and chemical nature of the wastes involved.

For other wastes in the categories D001, D002, and D003, EPA recognizes that:

> Within each of these subcategories there appears to be a further variety of different waste groups, each with a certain degree of uniqueness with respect to hazard and handling requirements.

See 54 Fed. Reg., at 48419. EPA further concluded that for these wastes "deactivation" was the appropriate method of treatment. AISI believes that uniqueness and concern for safe handling are equally important for the D003 cyanide and sulfide wastes. Designating "deactivation" as the method of treatment would provide the needed flexibility to select treatment technology for these wastes, while assuring safe handling procedures for the wastes. AISI, therefore, recommends that for these D003 cyanide and sulfide wastes the standard be "deactivation as a method of treatment."

COMMENT NUMBER: 4-F-4
DOCKET NUMBER: LD12-00160
COMMENTER: American Iron and Steel Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
RESPONSE:

EPA agrees with the commenter that "deactivation" is the best treatment standard for D003 sulfide wastes and is therefore promulgating "deactivation to remove the characteristic of reactivity" for wastes in the D003 sulfide subcategory. EPA believes that that the test method used in determining reactive sulfide needs to be standardized before establishing a numerical standard based on the test method.

Comment Number: 4-F-5
Docket Number: LD12-00227
Commenter: Union Camp
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: Reactive Sulfide Definition
Comment:

Union Camp urges EPA not to use the 500 mg hydrogen sulfide gas generation per kilogram of waste as the threshold to identify reactive sulfide waste. There is no need for such a numeric threshold as the existing criteria have proven adequate, and the proposed rule would contradict EPA's existing rule. Furthermore, the use of such a concentration-based threshold is arbitrary and has not been supported by the required rulemaking procedure. Thus, EPA has no basis for using it and should not do so.

COMMENT NUMBER: 4-F-5
DOCKET NUMBER: LD12-00227
COMMENTER: Union Camp
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
RESPONSE:

Until EPA can develop analytical methods capable of accurately determining quantitative characteristic hazards, industry must judiciously make qualitative technical decisions dependent on the waste definition. EPA is not making any Section 3001 determinations in this proceeding.

Comment Number: 4-F-6
Docket Number: LD12-00243
Commenter: NCASI
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: Reactive Sulfide Definition
Comment:

(5) Uncertainty about (a) the analytical method to be used and (b) the lack of a justification for the threshold value preclude comment on the threshold value for toxic gas generated from reactive sulfide wastes.

The preamble discusses a criterion of 500 mg H_2S gas generation per kilogram of waste as the threshold for identification of wastes to be included in the reactive sulfide waste subcategory. "The Agency is proposing to use this number to identify the wastes in this subcategory..." (FR 54 48425). We could find no reference, however, in the proposed rules to the use of this criterion for implementing the treatment standards.

In any event, the agency has failed to adequately demonstrate the need for the numeric threshold. Determination of the existence of a "reactivity" hazard is now left to the reasonable judgement of the generator based in part upon the generators past experience with the waste. More specifically, guidance offered in 1980 by the Director of the Hazardous Waste Division of EPA's Office of Solid Waste indicated potential waste reactivity would appropriately be judged on the basis of whether: (a) there is a history in management of the waste where people have been significantly injured, and (b) a risk assessment developed around some "maximum credible accident" scenario suggests a danger. Through the years, the forest products industry has found that the narrative reactivity criteria and the associated guidance have proven technically adequate. We fail to see why these criteria cannot also be used to implement the treatment standards developed under the land disposal restrictions.

If the Agency insists on developing a numeric criterion, it should not be used until it is formally proposed and commented upon. A passing mention in a preamble to a proposed rule only indirectly related to hazardous waste identification does not constitute adequate warning to the regulated community that the Agency is proposing this criterion.

Comment Number: 4-F-6 (continued)
Docket Number: LD12-00243.
Commenter: NCASI
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: — Reactive Sulfide Definition

When and if the criterion is proposed, the regulated community will need to know (a) by what test method wastes will be measured against the criterion, and (b) the rationale for the 500 mg/kg criterion. NCASI has reviewed and commented to the Agency on various draft methods for determining H_2S generation from wastes. Most recently, we commented on proposed changes to SW-846. Included in these proposed changes was the addition of a method to determine hydrogen sulfide released from waste. To our knowledge, these changes have not been finalized. One of our comments on the proposed changes to SW-846 was that the 500 mg/kg criterion (a) was inappropriate for a manual of test methods, and (b) had not been justified.

The only justification that has ever been provided for the criterion is contained in the Claussen memorandum of July 12, 1985. This material has not been subject to public review and comment. Our examination of the material, however, has revealed several problems with the justification for the criterion. Important among them is the fact that the mismanagement scenario that forms the basis of the criterion is not a credible one. EPA has verbally acknowledged as much. Clearly, if EPA intends to develop a sulfide reactivity criterion, a more detailed examination is required of (a) the mismanagement scenario, (b) the methods used to model it, and (c) the suitability of the test procedure used to determine compliance with the resulting criterion.

Until the test method is finalized and the rationale for the criterion is published, it is not possible for NCASI to comment in the detail that is warranted on the appropriateness of the 500 mg/kg threshold. We believe that EPA should neither formally propose the threshold value nor use it informally unless the test method is finalized and the rationale for the criterion is published.

We appreciate having the opportunity to comment on the proposed Third-Third rules and hope that our comments are helpful.

COMMENT NUMBER: 4-F-6
DOCKET NUMBER: LD12-00243
COMMENTER: NCASI
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
RESPONSE:

Until EPA can develop analytical methods capable of accurately determining quantitative characteristic hazards, industry must judiciously make qualitative technical decisions dependent on the waste definition. Treaters must complete treatment until qualitative technical judgement indicates that the waste or waste residual no longer exhibits the characteristic hazard specified by the definition. EPA is not making any Section 3001 determinations in this proceeding.

Comment Number: 4-F-7
Docket Number: L010-00020
Commenter: SOCMA
Issue: D003 - Characteristic Reactive Wastes and Part U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Reactive Sulfide Definition

SOCMA also supports as environmentally sound and economically reasonable EPA's proposal to regulate residuals from the treatment of Reactive (D003) wastes only if they exhibit the characteristic of EP Toxicity for metals. We would suggest, however, that EPA not only develop numerical standards, but also to finalize a standard method for testing reactive sulfides to enable both EPA and the regulated community to easily implement the numerical limitation when it is promulgated.

COMMENT NUMBER: 4-F-7

DOCKET NUMBER: LD10-00020

COMMENTER: SOCMA

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Reactive Sulfide Definition

RESPONSE:

EPA believes that the test method used in determining reactive sulfide needs to be standardized before establishing a numerical standard based on the test method.

Comment Number: 4-F-8

Docket Number: L010-00033

Commenter: American Iron and Steel Institute

Issue: D003 - Characteristic Reactive Wastes and Pond U

Subissue: Wastes Containing Reactive Listing Constituents

Comment: Reactive Sulfide Definition

D003 Reactive Wastes - Cyanides and Sulfides. As pointed out in the regulatory proposal, D003 wastes in the reactive cyanide subcategory and in the reactive sulfides subcategory are defined as those wastes that generate toxic gases (assumed to be HCN or H_2S) when exposed to pH conditions between 2 and 12.5 in a sufficient quantity to present a danger to human health in the environment. The proposal points out "the agency has not approved a standard analytical method for testing either sulfides or reactive sulfides in hazardous wastes or in treatment residues." Nor has the agency approved a standard method for testing cyanide-containing materials to determine whether they release gases and "a sufficient quantity to present a danger to human health in the environment." Until these standard analytical methods have been defined, neither EPA nor industry can identify all of the wastes which may, at some time, be considered hazardous wastes under this subcategory. Until the agency develops these standard test methods, AISI recommends that the agency maintain the maximum flexibility in any regulations which may apply to this subcategory.

COMMENT NUMBER: 4-F-8
DOCKET NUMBER: LD10-00033
COMMENTER: American Iron and Steel Institute
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Reactive Sulfide Definition
RESPONSE:

EPA agrees with the commenter that methods need to be standardized for both the D003 sulfide and cyanide subcategories. For the D003 sulfide subcategory, EPA is promulgating "deactivation to remove the characteristic of reactivity" to allow the regulated community the flexibility to use the best technology for a particular waste. For the D003 cyanide wastes, EPA has established concentration-based standards. This, too, allows the regulated community the flexibility to use any technology so long as it can achieve the standard.

1.

Comment Number: 4-G-1
Docket Number: LD12-00015
Commenter: Atlas Environmental Services, Inc.
Issue: Characteristic Reactive Wastes + P and U Wastes Containing Reactive Listing Constituents
Subissue:
Comment: Explosive, Water Reactive, and Other Reactive Wastes

RE: 40 CFR Part 148, 261, 264, 265, 268, and 271.
Land Disposal Restrictions for Third-Third Scheduled Wastes; Proposed Rule.

Contained within the above proposed rule, Section III A.4.d.(3), Federal Register Page 48426, Volume 54, No. 224, dated November 22, 1989; proposed treatment standards for Ignitable, Corrosive, and Reactive Wastes; Reactive Characteristic Wastes; Explosives Subcategory is the following:

> "Incineration (of explosive wastes) also appears to be an applicable technology,so long as the incineration units must be specifically designed and fitted with explosive proof equipment. **Such units are not typically found at commercial incineration facilities.** The agency is aware that these types of units are currently used by the Department of Defense to treat explosive wastes ..."

The commenter, in response to solicitation by the EPA, respectfully reminds the EPA that a commercial reactive waste incinerator facility is in the permitting process in the state of Missouri. The permit applicant, Atlas Environmental Services, Inc., has submitted a RCRA Part A and Part B permit application to the Missouri Department of Natural Resources for a reactive waste incinerator specifically designed to environmentally deactivate explosive materials generated by the U.S. Department of Defense as well as the explosive and aerospace manufacturing industry.

Comment Number: 4-G-1 continued
Docket Number: LD12-00015
Commenter: Atlas Environmental Services, Inc.
Issue: Characteristic Reactive wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue:
Comment: Explosive Wastes

The following is as executive summary of the reactive waste incineration facility:

EXECUTIVE SUMMARY

COMMERCIAL RCRA REACTIVE WASTE INCINERATION FACILITY

Atlas Environmental Services, Inc., (AES), is a wholly owned subsidiary of Atlas Powder Company, located near Duenweg in Jasper County, Missouri. AES is a full-service reactive waste management company, providing waste analysis, packaging, transportation, and incineration services to the explosives manufacturing industry. AES has submitted a RCRA Part A and B Application in the state of Missouri to construct and operate an incinerator to deactivate off-specification and obsolete explosives, pharmaceuticals, ammunition, and propellants, as well as materials contaminated with reactive waste. Reactive waste feeds that will be processed and deactivated through incineration in this facility are in the form of solids, liquids, and slurries. Reactive wastes are generated by explosives manufacturers, other manufacturers, and by the U.S. Department of Defense (DOD). The EPA waste codes for these reactive wastes are D003, K044, K045, K046, and K047.

Typical Explosive Wastes	EPA Classification
• Ammunition: .22 Cal through 40 MM	(D003)
• Impulse Cartridges, Squibs, and Igniters	(D003)
• Detonators, Primers, and Transfer Leads	(D003)
• Fuzes, Bursters, and Boosters	(D003)
• Miscellaneous Cartridge/Propellant Actuated Devices	(D003)
• Non Wastewater Sludges from explosives manufacturers	(K044)
• Spent Carbon from Wastewater containing explosives	(K045)
• Sludges from Manufacturing lead/base initiating compounds.	(K046)
• Wastewater from Explosives Manufacturing	(K046)
• Pink/Red Water from TNT Operations	(K047)

Comment Number: 4-G-1 continued
Docket Number: LD12 - 00015
Commenter: Atlas Environmental Services, Inc.
Issue: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: Explosive Wastes
Comment:

Atlas Powder Company has operated an explosives manufacturing facility adjacent to the proposed AES Reactive Waste Incineration Facility site for more than 77 years. While accumulating extensive experience and knowledge in the safe management of explosive materials. The Rotary Kiln incinerator technology chosen for the AES Reactive Waste Incineration Facility has historically been demonstrated to be safe and suitable for deactivation of reactive waste. The Department of Defense has safely and successfully operated rotary kiln deactivation furnaces similar to the proposed AES Rotary Kiln incinerator for more than 30 years at more than 22 sites. This design is commonly referred to as Explosive Waste Incinerators or APE 1236 Deactivation Furnace. The kiln itself is designed to tolerate continuous reactive waste detonations. Throughout the DoD deactivation furnace sites, extensive feed rate experience has been gained over the past thirty years, which has resulted in process specifications to determine the explosive limitations of the rotary kiln. The DoD facilities have published feed rates for most every explosive device manufactured.

The AES Rotary Kiln incinerator is based on the same design developed by the DOD, however will be significantly upgraded in areas such as waste feed, environmental monitoring, and a more efficient air pollution control system. Major changes were engineered into the AES deactivation furnace to comply with RCRA permit writers guidance documents on PIC's, metals, and HCl. Another obvious difference is that the AES kiln is enclosed inside a containment building to control fugitive emissions from the kiln. The containment building operates under negative pressure and is exhausted to the APCD system. The DoD kilns are open to the atmosphere. Additionally, the AES APCD system includes an oversized secondary combustion chamber (four second residence time) and a soda ash spray dryer/scrubber.

The design in the AES permit application presented to the Missouri Department of Natural Resources meets the most stringent safety standards in accordance with the DOD, the Department of the Army, the Institute of Makers of Explosives, the Occupational Health and Safety Administration, the National Fire Protection Association, as well as accepted engineering standards. The design also fully complies with state and federal environmental regulations and guidelines. A complete list of AES standards and specifications can be found in the Part B Application filed with the Missouri Department of Natural Resources in Jefferson City, Missouri.

Comment Number: 4-G-1 continued
Docket Number: LD12-00015
Commenter: Atlas Environmental Services, Inc.
Issue: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: – Explosive Wastes
Comment:

Reactive Waste Incineration Process Description

The main components of the AES Reactive Waste Incineration Facility consist of waste feed storage, preparation and handling systems, and a thermal deactivation or incineration unit composed of a rotary kiln and secondary combustor. The facility also has an air pollution control system and a residual and ash handling system.

In addition to the waste feed storage, storage will be provided for the residual wastes, such as the ash from the kiln, the residues from the secondary combustor, baghouse and the spray dryer, and any contaminated wash water or rain water. These generated wastes will be stored on site until enough has collected to be shipped to an appropriate waste disposal facility, or as in the case of contaminated water, treated by incineration. Valuable metals and metal parts will be handled as recyclable materials and not as hazardous wastes. Please refer to the permit application for more detailed descriptions concerning this facility.

The thermal deactivation or incineration unit consists of two combustion chambers: rotary kiln and a secondary combustor. At the hot burner end of the rotary kiln the temperature can range from 800 to 1400° F. Opposite the burner end where the feed enters and the flue gas is discharged, temperature ranges from 300 to 700° F. Molten lead will be discharged into a recovery trough. Shell casings as well as other bulk metals will be discharged with any bottom ash onto a covered conveyor, which will discharge into a collection bin. The flue gas will then enter the secondary combustor, which is designed to operate at 2200° F and 4 seconds residence time.

After leaving the secondary combustor, the flue gas will enter a spray dryer in the air pollution control system. The spray dryer serves two main purposes: to quench the gas from 2200° F to approximately 350° F, and to remove pollutants such as acid gases and particulates. A soda ash slurry will be injected into the chamber, where the water evaporates leaving a dry waste product. The flue gas will then enter a baghouse, which is used to collect soda ash and other particulates in the flue gas stream. The baghouse will be cleaned periodically by forcing air through the bags. The residues that have collected on the bags will be purged and will accumulate in a drum at the base of the baghouse. After exiting the baghouse, the flue gas will be discharge to the atmosphere via a 210-foot high stack.

Comment Number: 4-G-1 continued
Docket Number: LD12 - 00015
Commenter: Atlas Environmental Services, Inc.
Issue: Characteristic Reactive Wastes and Part U Wastes Containing Reactive Listing Constituents
Subissue: Explosive Wastes
Comment:

The facility will receive, by truck delivery, various waste feeds in the form of reactive liquids, slurries and emulsions, and liquid and solid explosive waste. After receiving confirmation that the waste feed can be processed from an environmental and explosive standpoint, the trucks will proceed to the appropriate storage area for off-loading. Storage facilities for the hazardous waste will be an integral part of the Facility. Containerized waste feed will be stored in magazines. Because of the explosive nature of the wastes, they are stored according to DOD safety requirements specifying waste compatibility, container type, quantity limits, and distances to inhabited structures.

Liquid wastes will be stored in either containers, drums, or tanks at the liquid waste area. The container storage area will hold 160 55-gallon drums of waste; the tank storage area will hold 30,000 gallons of liquid in 3 separate tanks. The liquid waste facility has been designed to prevent the mixing of incompatible wastes by placing each tank in a separate diked area, and by separating the container storage area into two sections, divided by a berm.

Prior to deactivation by incineration, the explosive liquid or solid waste will be transported to the feed handling building, where pretreatment or decommissioning of the waste will be performed if necessary. Only four hours of feed may be kept in this building at any one time, due to safety considerations. If the waste feed material is a reactive liquid, slurry or emulsion, the material will be pretreated and mixed for injection into the secondary combustor.

I hope this summarizes our proposed reactive waste incinerator facility and answers some of your questions regarding the capability for reactive waste disposal. Should you have additional questions, please do not hesitate to contact Mr. Robert C. Morhard at Atlas Environmental Service,Inc. 15301 Dallas Parkway, Suite 1200, Dallas, Texas 75248 or telephone (214) 450-1218.

COMMENT NUMBER: 4-G-1
DOCKET NUMBER: LD12-00015
COMMENTER: Atlas Environmental Services, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency acknowledges and thanks the commenter for the information on reactive waste incineration. The Agency is aware that the Department of Defense is currently using these types of units to effectively and safely treat explosive wastes. The Agency received comments describing various treatment technologies applicable to D003-explosive wastes. The technologies included treatment in specialized reactive waste incinerators, treatment in conventional RCRA incinerators, and different types of chemical deactivation. The Agency has also reviewed data on innovative technologies for treatment of explosive wastes such as microwave treatment, magnetic separation, and catalytic oxidation. Based on this information, the Agency believes that there are a variety of technologies that are capable of removing the characteristic of reactivity in D003-explosive wastes. Therefore, the Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-explosives subcategory. The Agency has established this standard to allow the regulated community the flexibility to use the "best" technology for the specific explosive waste. See 40 CFR 268 Appendix VI for a list of applicable technologies that, used alone or in combination, can achieve this standard.

COMMENT NUMBER: 4-G-2

DOCKET NUMBER: LD12-00077

COMMENTER: ATLAS ENVIRONMENTAL SERVICES INC

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Explosive Water Reactive, and other Reactive Wastes

The following will serve to append comments submitted to EPA Docket F-89 LD 12-FFFFFF in a December 6, 1989 letter by Atlas Environmental Services, Inc. (AES); a company which is presently permitting a RCRA reactive waste incinerator as a commercial TSD facility in the State of Missouri.

The purpose of submitting additional comments is to avoid any confusion or misconception regarding this proposed AES reactive waste incineration facility.

1) To clarify those explosive wastes which historically have been incinerated by the DoD and will be treated in the AES reactive waste incinerator.
2) To further define the words "slurries" and "emulsions" as they relate to physical states of materials and not necessarily to classes of industrial explosives.
3) To withdraw any reference to the Institute of Makers of Explosives (IME) and any implication that the IME has any standards for explosive incineration.

1) Clarification Of Explosive Wastes That Can Be Incinerated

The AES rotary kiln incinerator has been patterned after the US Department of Defense (DoD) Explosive Waste Incinerators, specifically the APE 1326 Deactivation Furnace. Because the DoD has such an impressive explosive safety record, operating over twenty-two explosive waste incinerators, some for almost thirty years; it is important for AES to adhere to the DoD's operating procedures. AES will seek to limit those potential waste explosive feed stocks to only those which the DoD has demonstrated to be safe for incineration. The typical DoD waste feed contains mostly components such as ammunition, fuzes and detonators; which generally have their explosive charges confined within metallic devices. As a result, the explosive charges are not directly heat shocked and momentarily tolerate the drastic temperature change during the feed process. Once safely inside the 800° F heavy steel walled rotary kiln, the explosive devices are allowed to detonate and are rendered nonreactive.

The following table generically illustrates several different classes of reactive wastes and the historically proven applicable explosive disposal method.

COMMENT NUMBER: 4-5-2 continued

DOCKET NUMBER: LD12-00077

COMMENTER: Atlas Environmental Services Inc

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Explosive Water Reactive, and other Reactive Wastes

Class of Explosive Waste	Open Burning Required For Safety	Demonstrated Safe For Incineration By The DoD
Munitions & Devices		
Blasting Caps		X
Detonators		X
Igniters		X
Boosters		X
Bursters		X
Ammunition		X
Fuzes		X
Impulse cartridges		X
Gas generators		X
Explosive actuated devices		X
Industrial Explosives		
Commercial dynamite	X	
Emulsions, high explosive	X	
Emulsions, blasting agents	X	
Slurries, high explosives	X	
Slurries, blasting agents	X	
ANFO or ANFO blend blasting agents	X	

2) Reference to Industrial Explosives And Clarification Of The Terms "Slurry" and "Emulsion" As They Relate To Industrial explosives As Well As General Physical States Of Matter.

Within the text of the executive summary the terms "slurry" and "emulsion" were used to describe the physical states of some of reactive wastes that will be received by the AES facility. The terms "emulsion" and "slurry" relate to general physical states of matter and not classes of industrial explosives. Wastes such as explosive waste water slurries, waste water emulsions, pink/red water slurries from TNT manufacturing and other reactive waste which contain in excess of 25% water are good candidates for incineration. However, commercial explosive products such as high explosive and blasting agent slurries and emulsions contain less than 20% water and are highly temperature sensitive and as a result not safe for incineration. It must be noted that explosive waste that has not been thoroughly tested by the DoD for incinerability and assigned a feed rate must undergo extensive safety tests by AES prior to incineration.

COMMENT NUMBER: 4-5-2 continued
DOCKET NUMBER: LD12-00077
COMMENTER: Atlas Environmental Services Inc
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

3) **Reference To The Institute Of Makers Of Explosives By AES**

The commenter wishes to withdraw and retract the reference to the Institute of Makers of Explosives (IME); and any implied suggestion that the IME has any standards involving the proposed AES explosive waste incineration facility. The extensive IME Safety Library Publications provide an excellent reference tool for any organization which manufactures, transports, stores or uses explosive materials. However, in terms of explosive safety and specifically during the storage, handling and incineration of explosive waste the AES facility will be designed to and adhere to the DoD Contractors Explosive Safety Manual which outlines operational standards, safety precautions, and other applicable engineering standards to assure explosive safety.

For additional information on the proposed AES RCRA Reactive Waste Incineration and TSD Facility please feel free to contact me.

COMMENT NUMBER: 4-G-2
DOCKET NUMBER: LD12-00077
COMMENTER: Atlas Environmental Services, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency acknowledges and thanks the commenter for the additional information on reactive waste incineration. The Agency is aware that the Department of Defense is currently using these types of units to effectively and safely treat explosive wastes. The Agency received comments describing various treatment technologies applicable to D003-explosive wastes. The technologies included treatment in specialized reactive waste incinerators, treatment in conventional RCRA incinerators, and different types of chemical deactivation. The Agency has also reviewed data on innovative technologies for treatment of explosive wastes such as microwave treatment, magnetic separation, and catalytic oxidation. Based on this information, the Agency believes that there are a variety of technologies that are capable of removing the characteristic of reactivity in D003-explosive wastes. Therefore, the Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-explosives subcategory. The Agency has established this standard to allow the regulated community the flexibility to use the "best" technology for the specific explosive waste. See 40 CFR 268 Appendix VI for a list of applicable technologies that, used alone or in combination, can achieve this standard.

COMMENT NUMBER: 4-6-3

DOCKET NUMBER: LD12-00124

COMMENTER: ROLLINS ENVIRONMENTAL Services INC

ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes

SUBISSUE: Containing Reactive Listing Constituents

COMMENT: Explosive Water Reactive, and other Reactive Wastes

In connection with D003 explosives, certain categories of wastes which meet the definition of "explosives" can be incinerated in regular RCRA incinerators, particularly small quantities and at controlled feed rates. EPA should not suggest that "special incineration" is always required for all wastes meeting the definition of "explosives".

COMMENT NUMBER: 4-G-3
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency acknowledges and thanks the commenter for the information on reactive waste incineration. The Agency received comments describing various treatment technologies applicable to D003-explosive wastes. The technologies included treatment in specialized reactive waste incinerators, treatment in conventional RCRA incinerators, and different types of chemical deactivation. The Agency has also reviewed data on innovative technologies for treatment of explosive wastes such as microwave treatment, magnetic separation, and catalytic oxidation. Based on this information, the Agency believes that there are a variety of technologies that are capable of removing the characteristic of reactivity in D003-explosive wastes. Therefore, the Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-explosives subcategory. The Agency has established this standard to allow the regulated community the flexibility to use the "best" technology for the specific explosive waste. See 40 CFR 268 Appendix VI for a list of applicable technologies that, used alone or in combination, can achieve this standard.

COMMENT NUMBER: 4-G-4
DOCKET NUMBER: LD12-0023
COMMENTER: Reactive Waste Services, Inc.
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

The commenter agrees with the Agency's decision to create five subcategories for the D003 Reactive Waste. However, in order to effectively comply with the statutory requirements of HSWA (i.e. prohibiting land disposal of hazardous constituents without appropriate treatment and preventing migration of hazardous constituents from the disposal unit), the Explosives Subcategory should be subdivided into two sets for which Incineration is designated as BDAT. The explosive wastes were grouped into two sets based on the generating sources, physical and chemical characteristics, and the demonstrated application of incineration as the best demonstrated treatment technology. The wastes representative of each of the two sets of the D003 Explosive Subcategory have been safely and effectively deactivated by incineration in rotary kilns for more than 30 years. Existing incineration facilities dedicated to the deactivation of Explosive wastes accept:

* Off-specification and obsolete pyrotechnic explosive propellant (PEP) products;

* Explosive contaminated waste materials from the explosives manufacturing industry;

* Explosive contaminated soils, sludges, and debris from CERCLA remediations; and

* Explosive contaminated soils, sludges, and debris from RCRA corrective actions, and closures of hazardous waste units.

The two D003 Explosive Subcategory sets and representative wastes for which the BDAT should be Incineration are presented in the following paragraphs. Table 1 provides a list of the two Explosive Sets and representative explosive wastes for each Set. Set A consists of manufactured hardware that contains energetic materials. Ammunition is an example of Set A. Set B consists of off-specification and/or out-of-date non-hardware explosive products. Dynamite is an example of Set B. Physical and chemical characterization data for representative wastes in each of the D003 Explosive Sets are presented below and in Appendix A.

D003 Explosive Set A

Boosters

Boosters are devices which contain a secondary explosive and are used to transfer the initiating stimulus from the fuze assembly to the main charge. Tetryl is the main component of the pyrotechnic,

COMMENT NUMBER: 4-G-4 CONTINUED
DOCKET NUMBER: LD12-00023
COMMENTER: Reactive Waste Services Inc
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

Table 1

D003 Explosive Waste Sets

Set A	Set B
Boosters	Emulsions
Fuzes	Propellants
Detonators & Primers	Dynamites
Ammunitions	Pharmaceuticals
Igniters	Signal Tube/Detonating Cord
Signals	Explosive Contaminated Soil & Debris

explosive, propellant (PEP) in boosters, however a small amount of Lead Azide or Barium Stearate may be present. The total PEP weight generally ranges between 300 grains and 2 kg per item.

Fuzes

Fuzes are used to initiate an explosive train from a primer to a booster and ultimately to the main charge in order to produce to detonation of ammunition or other explosives. Fuzes that are typically incinerated include point detonating, auxiliary detonating, base detonating and grenade fuzes. The PEP weight of the first three fuzes identified above is composed of Tetryl, RDX, or Lead Azide. Fuzes may contain Barium Chromate, Lead Azide, Antimony Trisulfide, Mercury Fulminate, Lead Styphnate or Barium Nitrate. The trace metals generally contained in fuzes include Barium, Lead, Chromium, Beryllium, and Antimony. The DoD has established feed rates for its rotary kilns for the safe incineration of most fuzes manufactured in the United States.

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Detonators and Primers

Detonators constitute the starting point of an explosive train or a train of initiation. Primers are devices inserted after the detonator to increase the explosives stimulus from the detonator in order to effectively initiate the booster. Mechanical (or stab detonators) and electric detonators are two representative detonator types that are typically incinerated. The main constituents of the mechanical detonators typically include Barium Chromate, Lead Azide, Lead Styphenate, Antimony Trisulfide, Barium Nitrate, Mercury Fulminate, and/or Silver Azide. Primers are composed of Tetryl or other primary explosives.

Ammunitions

Wastes included in the D003 Explosive Subset A include ammunition such as 20 MM through 76 MM munitions. Each unit consists of a metal shell casing, Pyrotechnic, Explosive and Propellant (PEP) material, a fuze, a projectile, and a primer. Nitrocellulose and nitroglycerine are the primary PEP constituents in the 20 MM munition. The shell casing is generally aluminum or brass, and the projectile is steel or lead. The primer and fuze components vary depending on the type of munition. The DoD has established feed rates for incineration of all munitions up to and including the 76 MM.

Igniters

Electric Igniters and Rocket Motor Igniters are representative examples of Igniters which are typically incinerated. Electric igniters are the prime element for igniting a detonating compound or an igniting compound.

Rocket motor igniters are designed to ignite the propelling charge in a rocket motor. They consist of an electric igniter and a fast burning composition assembled as one unit. The rocket motor igniters contain Black Powder as their primary PEP ingredient. The total quantity of PEP in each cartridge generally ranges from 10 grains to 60 grains.

Signals

Signals are devices which are designed to produce a signal by means of sound, flame, or smoke. Illuminating signals are typically incinerated. The PEP of illuminating signals are composed primarily of Black Powder, ground Magnesium Powder, Potassium Nitrate, Strontium Nitrate, and mixtures of metals to produce various colors.

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D003 Explosive Set B

Emulsions

Emulsions are generally composed of ammonium nitrate, mineral oil, a non-hazardous emulsifier, and from 5 to 50 percent water. The principal component in an emulsion is ammonium nitrate. Depending on the emulsion's intended application, the formulation may also contain fuel oil, sodium nitrite, sodium perchlorate, ethylenediaminedinitrate, aluminum powder, calcium nitrate, and wax. Emulsion products may be sold in bulk or in plastic or paper bags.

Propellants

Nitroglycerine, nitrocellulose ammonium perchlorate, diethylene glycol, HMX and aluminum are the typical components of propellants. Propellants may be transported in the form of a slurry, which may contain 50 to 80 percent water.

Dynamites

Dynamites are combinations of nitrate esters such as nitroglycerine, Ethylene Glycol Dinitrate (EGDN), Diethylene Glycol Dinitrate (DEGDN), and/or Metriol Trinitrate (MTN); nitrate salts such as ammonium nitrate; and wood pulp or a similar material. Nitrocellulose is also used as a plasticizer or gelatinizer, particularly in gelatin dynamites. Dynamites are high explosives and are packaged in paper, cardboard or plastic cartridges (sticks) of various sizes.

Signal Tube/Detonating Cord

Signal tube is a self-contained explosive tube used to transmit timing and firing signals in commercial blasting. It is composed primarily of extruded polyethylene or polyester with the explosive component either impregnated in the molten plastic during extrusion or "dusted" on the interior of the tube. The explosive component is generally composed of aluminum, ammonium perchlorate, and polyvinyl alcohol. Detonating cord is similar to signal tube, except the center core is a cotton or synthetic yarn covering an extrusion of a high explosive typically made with Pentaerythritol Tetranitrate (PETN) or Cyclo-Trimethylene Trinitramine (RDX). The explosive core loads range from 5 grains/foot to 2000 grains/foot.

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Pharmaceuticals

Off-specification or out-of-date pharmaceuticals containing nitroglycerine as the primary reactive ingredient are a D003 Waste Explosive. The remainder of the pharmaceutical is generally lactose and many contain some 1,2 propylene glycol.

Explosive Contaminated Soils and Debris

Explosive contaminated soils, sludges and debris resulting from CERCLA remediations, RCRA Corrective Actions, and Hazardous Waste Treatment, Storage, and Disposal Unit Closures are also D003 Explosive Wastes.

The explosive wastes presented in D003 Subcategory Explosive Sets A and B are representative of the explosives wastes currently being deactivated via incineration in the United States by the DoD. Incineration is the Best Demonstrated Available Technology for the explosive wastes represented by these two Sets. Open Burning/Open Detonation of these Sets of Explosive Waste permits the uncontrolled release to the environment of the following products of combustion:

- Appendix VIII Hazardous Constituents
- Carcinogenic and Toxic Metals
- Products of Incomplete Combustion (PIC's)
- NO_x
- SO_x
- Particulates
- HCl

The Commenter urges the Agency to compare the ultimate fate of D003 Explosive Waste hazardous components emitted to the environment during Open Burning/Open Detonation to the ultimate fate of those same components emitted during incineration.

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3. D003 Explosive Waste Treatment Technologies

The Agency is proposing a general treatment standard of "Deactivation as a Method of Treatment" for the D003 Waste Subcategory Explosives. In the Preamble to the proposed rule, the Agency has stated that each Subcategory of D003, i.e. Explosives, has as a "variety of different waste groups, each with a certain degree of uniqueness with respect to hazard and handling requirements". The preamble goes on to state "the Agency believes that the actual method of Deactivation chosen for each waste may be specific to that waste and may be best determined by the generator or the treater most knowledgeable as to the waste's unique hazards and handling requirements". Additionally, the preamble states that "the Agency currently has no information that suggests that one particular technology may be generally applicable to all the wastes within each particular characteristic subcategory, nor that there is one particular technology that can be identified as Best", but "this does not preclude the Agency from making such a determination in the future should additional information and data become available"[4].

The commenter is providing the Agency with physical and chemical characteristic data, and evidence of over 30 years of waste explosive incineration experience by the U.S. Department of Defense as proof that Incineration of the two previously identified D003 Explosive Waste Sets is the Best Demonstrated Available Technology. The United States Army Environmental Hygiene Agency Stationary Air Pollution Source Assessment No. 42-21-0443-85 RCRA Baseline Data Testing Incineration of Explosive Material (1984)[5] presents the explosive wastes deactivated by incineration. The DoD's Explosive Waste Feed List and incinerator operating parameters are included in Appendix B.

The Agency proposed concept of allowing the regulated community to determine the treatment method for a waste is inadequate, illegal, and allows the regulated community to openly violate the Hazardous and Solid Waste Amendments[2]. Additionally, this Agency proposal promotes endangerment of human health and the environment by allowing uncontrolled emissions of toxic, carcinogenic, and hazardous constituents into the air, soil, water, foodchain, and ultimately the human body as a result of Open Burning/Open Detonation.

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Allowing the regulated community to select their own treatment technologies does not promote waste minimization or recycle of natural resources. A generator of hazardous waste will select the least protective and least expensive treatment or disposal option unless required by law to select a more protective i.e. more costly option. In most cases, the greater protection afforded human health and the environment by a treatment or disposal technology, the greater the waste management cost to the generator. As long as the Agency allows Open Burning/Open Detonation of Explosive wastes, the generators of those wastes will make little, if any effort to minimize the wastes generated or recycle any natural resources such as metals. Open Burning/Open Detonation is an archaic, inefficient, inexpensive and dangerous approach to disposal of explosive waste that does not comply with the HSWA of 1984. Open Burning/Open Detonation does not promote waste minimization, does not promote recycle of metals, and endangers both human health and the environment via uncontrolled emissions of hazardous, toxic, and carcinogenic constituents.

Volume VII of the National Disposal Site Candidate Waste Stream Constituent Profile Reports[6], prepared under EPA Contract in 1973, evaluated the waste management practices, toxicity and hazards of Explosives, Propellants, and Chemical Warfare Materials. In 1973, the EPA, via this report, recognized, documented and publicly stated that in most cases the technique of Open Burning Explosives and Propellants "is unsatisfactory" and "controlled incineration" in a rotary kiln is the "preferred method of disposal". This document was published eleven years prior to the HSWA which prohibited migration of hazardous constituents from disposal units and required the Agency to designate BDAT for D003 Explosive Wastes.

4. Incineration as BDAT for D003 Explosive Waste Sets

The Resource Conservation and Recovery Act as amended in 1984 by the Hazardous and Solid Waste Amendments clearly requires the Agency to establish treatment standards for wastes subject to the land disposal prohibition which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term treats to human health and the environment are minimized (RCRA Section 3004(m)(1)).

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The Preamble to the proposed Third Third Land Ban regulation describes the process the Agency uses to develop Best Demonstrated Available Technology for each Characteristic or Listed Waste[7,8]. The Commenter fully supports the Agency's approach and respectfully requests the Agency apply the well documented and successfully implemented approach to the selection of Incineration as BDAT for the D003 Explosive Waste Subcategory. The Preamble states "the first step in the development of treatment standards is to divide the wastes to be regulated into groups based on similar physical and chemical properties. These waste treatability groups take into account differences in the applicability and effectiveness of treatment for those particular wastes. The Agency initially decides how wastes should be grouped by examining whether the wastes are generated by similar industries or from similar processes."

The two treatability Sets of D003 Explosive Wastes proposed by the Commenter for designation of Incineration as BDAT were created based on the similarity of the explosive wastes':

- Physical and chemical properties;
- Deactivation treatment applicability, effectiveness, and safety;
- Generating Industries; and
- Generating Processes

Table 1, D003 Explosive Waste Sets, lists those explosive wastes that have similar physical or chemical properties, similar generating industries, similar generating processes, and for which deactivation by Incineration has been demonstrated over the past 30 years to be applicable, effective, and safe.

The second step used by the Agency in the development of treatment standards is to identify the Best Demonstrated Available Technology for each treatability group. According to the Preamble, "a treatment technology is considered to be demonstrated primarily based on data from full-scale treatment operations that are currently being used to treat the waste (or similar waste)"[7]. The United State Government's Department of Defense has safely operated over 20 Rotary Kiln Deactivation Incinerators for over 30 years without a single lost time accident or loss of life[9]. The U.S.

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Government selected and implemented Incineration as the treatment method for remediation of explosive contaminated soils at two U.S. Army Ammunition Plants[10]. The U.S. Army Toxic and Hazardous materials Agency (USATHAMA) is nearing completion of its' second remedial action program where on-site rotary kiln incineration of explosive contaminated soils and debris was safely and effectively performed.

The Preamble also states "the Agency is aware that these types of units [explosive waste incinerators] are currently used by the Department of Defense to treat explosive wastes, and there appears to be a decrease in reliance on open detonation". The Commenter believes the extensive application of incineration by the U.S. Government to treat it's own explosive waste is an excellent "demonstration" that Explosive Waste Incineration is demonstrated technology for the D003 explosive waste sets defined previously.

The Preamble to the proposed regulation discusses the "Transfer of Treatment Standards" and the application of "Best Engineering Judgement" (BEJ) in conjunction with the Agency's selection of the Best Demonstrated Available Technology for waste treatment[11]. The Agency believes it is unnecessary to test the performance of BDAT on every waste and that based on similarities in waste stream characteristics, constituents, generating industries, and processing steps, the transfer of treatment performance data for untested wastes is technically valid. The application of Best Engineering Judgement by the Agency in assessing whether Incineration represents BDAT for the two D003 Explosive Waste Sets should utilize the transfer of treatment performance data. The treatment performance data, i.e. the safe and effective incineration of DoD explosive wastes representative of the two previously identified D003 Explosive Sets, indicate the DoD's incineration system was well-designed and well-operated. Pursuant to the information presented above, Incineration is a demonstrated technology for the deactivation of D003 Explosive waste.

Following the Agency's identification of demonstrated technologies, a determination as to "whether these technologies may be considered available is made". In order for a technology to be available, the preamble states "the technology itself or the services of the technology must be able to be purchased, and the technology must substantially diminish the toxicity of the waste or reduce the likelihood of migration of the waste's hazardous constituents"[7].

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The Commenter respectfully reminds the Agency that the Statute both requires and provides the legal mechanism for the selection of the treatment technology that substantially diminishes the toxicity of the waste and substantially reduces the likelihood of migration of hazardous constituents from the waste in order to minimize the short and long term threats to human health and the environment, even if National Capacity does not exist for that technology at the time the regulation is promulgated.

RCRA Section 3004(h)(2) allows the Agency to establish "an effective date different from the effective date which would otherwise apply with respect to a specific hazardous waste which is subject to a prohibition under subsection (d), (e), (f), or (g) or under regulations under subsection (d), (e), (f), or (g)". RCRA Section 3004(h)(2) provides for the establishment of an alternate effective date based on "earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available". Additionally, Section 3004(h)(2) also specifies that the alternative "effective date shall in no event be later than 2 years after the effective date of the prohibition". RCRA Section 3004(h)(3) allows the granting of a one year extension, renewable once for no more than one additional year, on a case-by-case basis when the "applicant demonstrates that there is a binding contractual commitment to construct or otherwise provide such alternative capacity but due to circumstances beyond the control of such applicant such alternative capacity cannot reasonably be made available by such effective date".

A RCRA Incinerator permit application recently filed with EPA Region VII suggests that commercial explosive waste incineration will be available by December 30, 1991 to deactivate via incineration the D003 Subcategory Explosive Waste. In addition, the Commenter anticipates submitting RCRA Part A and Part B Permit Applications to several State Agencies within the first half of 1990 for rotary kiln incinerators dedicated to the thermal destruction of those D003 Explosive Waste Sets identified in Table 1. Additionally, the Commenter is aware that two Companies are preparing RCRA permit applications to incinerate their own explosive wastes for submission to the authorized State Agencies in Utah and Illinois. EPA is well aware of the waste disposal industry's ability to provide capacity when it becomes needed.

The Commenter's Applications still in preparation contain incinerator air pollution control device designs which will assure compliance with the proposed RCRA Incinerator Emissions Regulations for Products of Incomplete Combustion (PIC), Carcinogenic and Non-Carcinogenic Metals, and HCl[12]. These proposed regulations stringently control incinerator emissions based on feed rate controls, site-specific dispersion modeling and risk assessment

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procedures to insure the lifetime cancer risk to the most exposed individual is less than 1 in 100,000[13].

Explosive Wastes contain, at a minimum, hazardous constituents which are uncontrollably emitted to the environment during open burning/open detonation. The dilution in the atompshere of organic constituents, products of incomplete combustion, metals, and HCl as a result of open burning/open detonation is in direct violation of 40 CFR 268.3. This regulation states "no...operator of a treatment...facility shall in any way dilute a restricted waste or the residual from treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with Subpart D of this part, to circumvent the effective date of a prohibition in Subpart C of this part, to otherwise avoid a prohibition in Subpart C of this part, or to circumvent a land disposal prohibition imposed by RCRA section 3004"[14]. The EPA has proposed amendments to the Subpart O, Part 264 hazardous waste incinerator rules. The proposal states the Agency's conclusion that emissions of metals, HCl and Products of Incomplete Combustion from hazardous waste incinerators can pose unreasonable levels of risk, and in those cases, need to regulate more stringently than under existing rules in order to protect human health and the environment[15]. In order to ensure protection of human health and the environment, emissions resulting from open burning/open detonation of explosive wastes must be as stringently controlled as incineration emissions will be in accordance with the standards recommended by EPA in the document "Guidance on Metals and Hydrogen Chloride Controls from Hazardous Waste Incineration"[13] and "Guidance on PIC Controls for Hazardous Waste Incinerators"[15].

The Guidance set forth by these documents enables the permit writer to exercise his authority under Section 3005(c)(3) of the Resource Conservation and Recovery Act to develop permit requirements necessary to ensure emissions do not pose unacceptable risk to human health. The documents provide methods for emissions control intended to ensure that those emissions reaching the maximum exposed individual do not exceed ambient health-based levels. Incinerator Permit applicants demonstrate compliance with these ambient levels by emissions testing and using site-specific dispersion modeling consistent with the EPA "Guideline on Air Quality Models"[16]. The Commenter respectfully asks the Agency why incinerator emissions are stringently controlled based on health risk to the most exposed individual while equally hazardous and toxic emissions from open burning/open detonation are completely uncontrolled? Open burning of toxic chemicals is simply not legal in the U.S. except in this case.

The Commenter believes the carcinogenic and Air Toxic Emissions resulting from deactivation via open burning/open detonation of the 22 million gallons[17] of D003 wastes present large risks to human

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health and the environment. The human health benefits achieved by designation of Incineration as BDAT for D003 Explosive Wastes in lieu of Open Burning/Open Detonation are far more significant for this class of land ban wastes than for those achieved for other wastes classes of similar size. The Commenter respectively asks the Agency to calculate the reduction in emissions and resulting health benefits in terms of reduced cancer deaths based on designation of Incineration as BDAT for the D003 Explosive Wastes identifies in Set A and B.

III. FORMAL REQUEST FOR INCINERATION AS BDAT FOR D003 EXPLOSIVE WASTE SETS

The Commenter respectfully requests the Agency designate **INCINERATION AS BDAT** for the D003 Explosive Waste Sets A and B. The Commenter respectfully request the Agency designate the effective date for Incineration as BDAT for the D003 Explosive Waste Sets as May 8, 1992. These two requests are based on the following facts:

1. Open Burning/Open Detonation of Explosive waste constitutes land disposal as defined by RCRA Section 3004(k).

2. Open Burning/Open Detonation of Explosive wastes violates RCRA Section 3004(d)(1) and 3004(g)(5) which prohibits the migration of hazardous constituents from the disposal unit.

3. Incineration of Explosive Wastes insures compliance with the HSWA by substantially diminishing the toxicity of the waste and the likelihood of migration of hazardous constituents from the waste.

4. Incineration of Explosive Wastes insures compliance with the HSWA by minimizing the short-term and long-term threats to human health and the environment through stringent control of emissions containing Products of Incomplete Combustion, Carcinogenic and Non-Carcinogenic Metals and HCl in order to assure the cancer risk to the most exposed individual does not exceed 1 in 100,000.

5. Incineration of Explosive Wastes furthers the Statutory Goals of Waste Minimization and Recycling.

6. Incineration of Explosive Wastes is a Demonstrated Technology and has been the leading technology selected by the DoD to effectively and safely deactivate its own explosive wastes and remediate its own facilities.

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7. The National Disposal Site Candidate Waste Stream Constituent Profile Report[6], prepared under EPA Contract in 1973, stated that in most cases the technique of Open Burning Explosives and Propellants was unsatisfactory and controlled incineration in a rotary kiln was the preferred method of disposal.

8. Application of Best Engineering Judgement and Transfer of Treatment Standards for the wastes within the two Sets of the D003 Explosives Subcategory allows the Agency to designate Incineration as BDAT for the D003 Explosive Sets without testing the performance of BDAT on every waste. This mechanism also allows for the addition of other D003 Explosive Wastes to the two sets or creation of addition Sets as additional knowledge regarding the safe incineration of explosives is acquired, thereby further protecting human health and the environment from the uncontrolled release of hazardous constituents.

9. Commercial Incineration of D003 Explosive Waste will be available by December 30, 1991. RCRA Section 3004(h)(2) provides the legal mechanism by which the Agency may designate an alternate effective date to the land disposal prohibitions based on national capacity/commercial availability of the Best Demonstrated Available Technology.

10. Open Burning/Open Detonation of Explosive Wastes allows the uncontrolled release of hazardous constituents including products of incomplete combustion (PIC), Carcinogenic and Non-Carcinogenic Metals and HCl into the environment potentially subjecting the most exposed individual to a greater than 1 in 100,000 risk of death by cancer.

11. Deactivation via Open Burning/Open Detonation is the ONLY treatment technology proposed to be designated as BDAT that allows the uncontrolled release of untreated Hazardous Constituents into the air, soil, surface water, groundwater, food chain, and ultimately the human population[18].

IV. JUSTIFICATION FOR INCINERATION AS BDAT FOR D003 EXPLOSIVES

1. Historical Background

Historically, explosives disposal has been accomplished by either open burning or open detonation. Open burning of explosives is traditionally accomplished by placing kindling in a cleared and barricaded area on the ground surface known as the "Burning Grounds", evenly distributing the explosive material (solid, liquid, or sludge) on top of the kindling, applying diesel fuel or

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similar material to the pile of kindling and explosive, laying a paper trail from the pile to some point away from the pile, and lighting the paper trail. The operator lights the paper trail and evacuates the area. The paper trail burns, igniting the fuel, explosives and the kindling. The pile burns until either the supplemental energy sources (fuel and kindling) are consumed or until the explosives and the supplemental energy sources are both consumed. After the pile has cooled, the operator returns to the area and visually inspects the remaining ash to determine if all the explosive material was burned. If visual inspection indicates the explosive waste was not completely burned, the process described above is repeated. The ash resulting from the open burning may be placed in a container after it is cool and prior to placement of the next burn pile, or it may remain in place on the ground surface until such time as the burn area is used again. The time between burns varies depending on the waste generation rate and the number of burning areas or bays the burning ground contains. The ash resulting from the open burning of waste explosives is generally a hazardous waste because of its metals content, i.e. the ash fails to pass the EP Toxicity Test. The placement of EP Toxic waste directly on the ground constitutes land disposal and as such, is a direct violation of the Resource Conservation and Recovery Act as amended by the Hazardous and Solid Waste Amendments of 1984.

The supplemental energy sources traditionally used to support open burning of explosives include scrap lumber, discarded shipping pallets, miscellaneous wood, cardboard, paper, tires, and diesel fuel or kerosene. Visible emissions from open burning of explosives range in color from white to yellow to black. Additionally, the particulate matter resulting from the open burning process ranges from visually non-detectable to large pieces of burning material transported by the wind out of the burning grounds area.

The open burning of explosive waste not only allows the uncontrolled release of hazardous constituents from the explosive wastes, but also from the supplemental fuel sources. It is a well know fact that diesel fuel, kerosene, tires, treated wood products, cardboard, and paper products emit products of incomplete combustion and other toxic and hazardous constituents during uncontrolled open burning. The uncontrolled emissions from open burning impact the air, soil, groundwater, surface water, enter the food chain, and ultimately impact human health. Section IV.2 of this comment contains representative emissions impact documentation developed for five representative explosive wastes. The assessment demonstrates the metals emissions from the five representative explosive wastes exceed the recommended human health protection standard of less than 1 in 100,000 cancer deaths for the most exposed individual by as much as 748 times in the worst case

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example.

The deactivation of explosives by open detonation may occur on the ground or underwater. Open Detonation was first used over one hundred years ago for the deactivation of black powder cannon balls and the technique has not changed. The explosive is deactivated by detonating in essentially the same manner as its intended use. During the Open Detonation process, high explosives are used to counter charge the munitions designated for deactivation. Enveloping these munitions with strong shock waves and detonation pressure deactivates the explosives within the munition casing, while neutralizing any of the munition's intended fragmentation effects. Detonation on the ground surface or in a shallow pit is a safety hazard and results in an air blast as well as the potential for creation of projectiles if the area is not clear of all objects. Deactivation of explosives wastes in this manner does not provide any protection to the environment, but in fact is an uncontrolled release of all the explosive's constituents to the environmental pathways along with those organic recombination products and products of incomplete combustion created as a result of the detonation.

Deactivation of explosives by underwater detonation constituents treatment of explosive wastes in a surface impoundment[19]. Therefore, all 40 CFR 264 or 265 Subpart K (Surface Impoundments) regulations apply to those surface impoundments used for underwater detonations. The Commenter respectfully asks the Agency if the surface impoundments used for Open Detonation of Explosive Wastes are constructed with the liners, leachate detection and collection systems, and groundwater monitoring wells; inspected and operated in accordance with Subpart K requirements; and have the necessary Interim Status or Part B Permits?

Following implementation of size reduction techniques, all of the munitions previously open detonated can be incinerated. The DoD rotary kilns operate with continuous 100 gram detonations. The techniques used to prepare explosives for incineration have been developed by the military, used for 30 years, and are standard techniques in the industry.

The Agency does not contemplate allowing open burning of hazardous waste containing hazardous constituents other than for the D003 Explosives Waste Subcategory. The practice of open burning/open detonation of explosive waste has been historically an "acceptable" technology based strictly on safe handling practices. However, open burning/open detonation is not a safe practice. Many employees have been killed or injured as a result of Open Burning and Open Detonation of Explosive Wastes. As recently as November 3, 1989, the Open Burning of D003 Explosive Wastes resulted in the death of one employee with 23 years experience, and severe head

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injuries to a second employee with 25 years experience. This terrible accident, reported by OSHA, occurred at Nitrochem Energy Corporation's Open Burning facility located at Biwabik, Minnesota. The DOD has incinerated selected Explosive Wastes for over 30 years without death or severe injury to personnel.

As the United States enters the 1990's, the technology is in place to safely incinerate selected D003 Explosive Wastes identified in Table 1. The Commenter requests the Agency to justify its proposed designation of "Thermal Destruction including Open Burning and Open Detonation" as Best Demonstrated Available Technology when in fact, the use of Open Burning and Open Detonation for the previously identified explosive waste clearly violates the HSWA and endangers personnel associated with the Open Burning/Open Detonation processes.

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SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency acknowledges and thanks the commenter for the information on reactive waste incineration. However, EPA could not determine a treatability group of explosive wastes that could be treated with incineration every time they were generated. The Agency received many comments describing various treatment technologies applicable to D003-explosive wastes. These technologies include incineration and different types of chemical deactivation. The Agency also reviewed data for innovative technologies that are applicable for treatment of explosive wastes such as microwave treatment, magnetic separation, and catalytic oxidation. Based on this information, the Agency believes that there are a variety of technologies that are capable of removing the characteristic of reactivity in D003-explosive wastes. Therefore, the Agency is promulgating a treatment standard of "Deactivation to Remove the Characteristic of Reactivity" for D003-explosives subcategory. The Agency has established this standard to allow the regulated community the flexibility to use the "best" technology for the specific explosive waste based on the chemical and physical parameters of the explosive waste and any safety considerations. See 40 CFR 268 Appendix VI for a list of applicable technologies that, used alone or in combination, can achieve this standard.

With regard to open burning/open detonation, EPA is not responding substantially to this comment. The issue of whether open burning/open

COMMENT NUMBER: 4-G-4 (continued)

DOCKET NUMBER: LD12-00023

COMMENTER: Reactive Waste Services, Inc.

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes

RESPONSE:

detonation in land disposal was settled in earlier rulemakings. See 51 FR 40577 (Nov. 7, 1986); 52 FR 21011 (June 4, 1987); and 53 FR 31158 (Aug. 17, 1988). EPA did not reopen this issue for comment, did not solicit comment, and is not responding substantively to those commenters raising the issue.

COMMENT NUMBER: 4-6-5
DOCKET NUMBER: LD12-00106
COMMENTER: Institute of Makers of Explosives
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

The Institute of Makers of Explosives (IME) is pleased to submit these comments in response to your November 22, 1989, Federal Register notice (54 Fed. Reg. 48371) proposing land disposal restrictions for the third scheduled wastes.

The IME is the safety association of the commercial explosives industry in the United States and Canada. It is a nonprofit, incorporated association concerned primarily with safety in the manufacture, transportation, storage, handling and use of explosives materials in blasting and other essential applications. The association has been in existence for over 75 years and has extensive experience in addressing safety issues, especially those arising as a result of the disposal of explosive waste.

Deactivation as a Method of Treatment Standard

The Environmental Protection Agency (EPA) has proposed "Deactivation as a Method of Treatment" for several subcategories of D001, D002, and D003 wastes. Two of the subcategories of characteristic waste are associated with manufacturing and handling of commercial explosives, D001 Oxidizers and D003 Explosives. The Agency has also proposed "Deactivation as a Method of Treatment" for K044, K045 and K047 wastes, which are also associated with commercial explosives manufacturing.

IME concurs with EPA's determination that there are a variety of different waste groups within these subcategories and that each waste has a "certain degree of uniqueness with respect to hazard and handling requirements." Therefore, the "method of 'deactivation' chosen for each waste may be specific to that waste and may be best determined by the generator or the treator most knowledgeable as to the waste's unique hazards and handling requirements."

EPA does not believe it can identify a best demonstrated available technology (BDAT) for "deactivation" of D001, D002 and D003 wastes; however, it does list "forms of deactivation." IME notes that EPA included open detonation as a "form of deactivation" but did not include open burning. IME presumes that EPA did not intend to preclude open burning as a "form of deactivation."

COMMENT NUMBER: 4-G-5 continued
DOCKET NUMBER: LD12-00106
COMMENTER: Institute of makers of Explosives
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

IME requests that EPA state that open burning is a "form of deactivation" for the wastes included under this standard. IME's experience is that open burning/open detonation (OB/OD) is the only safe and acceptable method of disposal for some explosive wastes. Listing open burning as a "form of deactivation" should not be controversial as EPA acknowledges that explosive wastes are typically treated by OB/OD (54 Fed. Reg. 48426). It also stated that OB/OD of explosive waste does not constitute land disposal and that it represents the BDAT for treatment of explosive waste in its final rule applying the land ban to listed wastes K044, K045, and K047 (53 Fed. Reg. 31158) of the first-third category of hazardous wastes.

In 1989, IME prepared a guidance manual entitled "Guidance Manual For Permitting of Open Burning/Open Detonation Facilities Under RCRA" which, in part, addresses the proper methods and requirements for OB/OD. The guidance manual was prepared in order to assist the states and EPA in reviewing Part B applications that various explosive manufacturing facilities have submitted to obtain final permitted status under RCRA. These applications are being reviewed for the most part under the criteria set forth at 40 C.F.R. Part 264 Subpart X, entitled "Miscellaneous Units." Although quite lengthy, IME is enclosing a copy of the guidance manual to assist EPA in determining that OB/OD represents BDAT for the vast majority of explosive wastes.

IME appreciates the opportunity to provide you with comments regarding this proposed rulemaking. IME stands ready to work with EPA in its efforts to develop a safe, effective and practical treatment standard.

COMMENT NUMBER: 4-G-5
DOCKET NUMBER: LD12-00106
COMMENTER: Institute of Makers of Explosives
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency agrees with the commenter that one technology cannot be specified to treat all wastes included in each subcategory and appreciates the commenter support for the "deactivation" standard. The Agency has promulgated "deactivation to remove the characteristic" as a treatment standard for some subcategories to render them nonreactive, noncorrosive, and nonignitable according to regulatory definitions. Although open burning and open detonation technologies can be used to deactivate, EPA recommends that they be used only in situations that pose an imminent, substantial threat of discharge where wastes consequently cannot be transported or treated otherwise in a safe manner. EPA believes that in some cases it may be desirable and appropriate for a waste to be mixed with water to reduce the potential for explosion and thus, to ensure safe handling and/or transportation for subsequent incineration or chemical treatment. If the waste material can be safely transported according to DOT requirements and accepted by a treatment facility, the Agency recommends that technologies such as incineration, chemical oxidation, or chemical reduction should be used to remove the characteristic of ignitability and/or reactivity. See 40 CFR Section 268 Appendix VI for a list of applicable technologies that used alone or in combination can achieve this technology standard. See also Section 268.42 Table 1 for a detailed description of all technologies referred to by a five letter technology code.

COMMENT NUMBER: 4-6-6
DOCKET NUMBER: LD12-00126
COMMENTER: IRECO INC.
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

1. Standards For Explosive Wastes.

A. Deactivation and Thermal Destruction as Treatment Methods

Of greatest concern to IRECO are the Agency's proposals for treatment of listed and characteristic explosive and oxidizer wastes. Our primary concern is that a variety of waste treatment methods, including open burning and open detonation, remain available for treatment of these wastes.

We agree with the Agency's statement with respect to the D001 Oxidizers and D003 Explosives, that "there appear to be a further variety of different waste groups [within these groups], each with a certain degree of uniqueness with respect to handling requirements." 54 Fed. Reg. at 48419. IRECO also agrees with the Agency's conclusion that there is no "one particular technology . . . generally applicable to all the wastes within each particular characteristic subcategory, nor . . . is one particular technology . . . 'Best.'" The great variety of commercial explosive wastes and the considerations for employing one or another method of treatment are described in the Institute of Makers of Explosives' (IME's) RCRA Guidance Manual for Permitting Commercial Explosives Industry Open Burning/Open Detonation Units, which the IME will be submitting along with comments on the proposed rules.

The Agency has proposed "deactivation as a method of treatment" for D001 Oxidizers, D003 Explosives, and listed explosives wastes K044, K045 and K047. Additionally, the Agency has proposed "thermal destruction" as a method of treatment for listed waste P081, nitroglycerin. The Agency mentions a number of examples of deactivation, including open detonation, incineration, chemical oxidation and others. We assume that the Agency intended to include open burning even though it is not specifically mentioned. Open burning, rather than open detonation, is probably the most commonly used method of treating explosive waste and we would appreciate clarification of the Agency's intent in this regard.

COMMENT NUMBER: 4-G-6 Continued
DOCKET NUMBER: LD12-00126
COMMENTER: IRECO INC.
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: Explosive Water Reactive, and other Reactive Wastes

B. Alternative Proposals

The need to have a variety of methods available for disposing of various types of explosive waste is also the reason we are less favorably disposed toward the Agency's alternative proposals for these wastes. For example, the alternative suggested at page 48419, column 3, to 48420, column 1, listing specific treatment technologies as methods of treatment, appears more restrictive. Again, it is not clear that "thermal destruction" is intended to include open burning and open detonation, although we assume from the prior comments that that is the intent of the proposal. Nonetheless, we have a concern that, without clarification, this proposal might be read more restrictively than the Agency intends.

IRECO is adamantly opposed to the second alternative of specifying one technology (e.g., open detonation) for all wastes that could be included in each subcategory. As mentioned above, there is a large variety of explosive wastes, some of which are amenable to one type of treatment such as open detonation, while other types are amenable only to another type of treatment such as open burning. This alternative would not allow the needed flexibility in treatment methods.

In summary, we believe that the Agency's proposal of deactivation as a treatment method is the best of the alternatives proposed. Another alternative the Agency may wish to consider, however, that would serve the same purpose, is to promulgate "nonreactive" as a treatment standard for D003 Explosives and "nonignitable" as a treatment standard for D001 Oxidizers. This proposal would maximize flexibility, while leaving selection of treatment method to the permitting process.

COMMENT NUMBER: 4-G-6

DOCKET NUMBER: LD12-00126

COMMENTER: IRECO

ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes

RESPONSE:

The Agency agrees with the commenter that one technology cannot be specified to treat all wastes included in each subcategory and appreciates the commenter support for the "deactivation" standard. The Agency has promulgated "deactivation to remove the characteristic" as a treatment standard for some subcategories to render them nonreactive, noncorrosive, and nonignitable according to regulatory definitions. Although open burning and open detonation technologies can be used to deactivate, EPA recommends that they be used only in situations that pose an imminent, substantial threat of discharge where wastes consequently cannot be transported or treated otherwise in a safe manner. EPA believes that in some cases it may be desirable and appropriate for a waste to be mixed with water to reduce the potential for explosion and thus, to ensure safe handling and/or transportation for subsequent incineration or chemical treatment. If the waste material can be safely transported according to DOT requirements and accepted by a treatment facility, the Agency recommends that technologies such as incineration, chemical oxidation, or chemical reduction should be used to remove the characteristic of ignitability and/or reactivity. See 40 CFR Section 268 Appendix VI for a list of applicable technologies that used alone or in combination can achieve this technology standard. See also Section 268.42 Table 1 for a detailed description of all technologies referred to by a five letter technology code.

Comment Number: 4-G-7
Docket Number: LD12-00023
Commenter: Reactive Waste Services Co., Inc.
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and Other Reactive Wastes

2. Environmental Impacts of Open Burning/Open Detonation

Hazardous constituents are mobilized to the environment when explosive waste is burned. Regardless of whether the open burning is conducted directly on the soil under an interim status permit or on an impermeable base under a new RCRA Subpart X permit, hazardous constituents are released. Several pathways are created by which organic and inorganic contaminants reach the environment, with air emissions constituting the most critical pathway for hazardous constituent migration due to the potential for direct inhalation by humans. Because of the critical problem of direct human inhalation, a simple quantitative example of the problem is presented here.

The following paragraphs provide an example of the metal emissions which could occur during five separate example open burning events. Table 2 provides a list of five types of D003 explosive wastes which will be used to calculate open burn emissions. Composition of these waste items was taken from the "Model Army Depot, Resource Conservation and Recovery Act, Trial Burn Test Plan"[20] . Column 1 in Table 2 gives the name and military designation number of the explosive waste item. Column 2 gives the number of items that are considered to be open burned in a one hour period for this example. Column 3 gives the name of explosive chemical compounds containing toxic or carcinogenic metals which are found in the example waste item. Column 4 gives the weight in grains of the explosive chemical compound found in each item. For the first item in Table 2, 19,500 M17 detonators, each containing 3.55 grains of lead azide, are assumed to be burned over a sixty minute period.

D003 explosive wastes contain metals in two separate forms: explosive chemical compounds and as the metallic component of metal parts. Chemical compounds are subject to high temperatures (2,000 F) during the reaction process in open burning. During this

Comment Number: 4-G-7 (Continued)
Docket Number: LD12-00023
Commenter: Reactive Waste Services, Inc.
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and Other Reactive Wastes

TABLE 2

Five example D003 explosive wastes, the associated example open burning rates, and the weight of metallic compounds occurring on a per item basis.

Item Name (1)	Open Burn Rate Items/Hour* (2)	Metallic Compounds Present (3)	Grains**/Item (4)
Detonator (M17)	19,500	Lead Azide	3.55
Fuze (MK45 Mod 0)	900	Lead Azide	7.08
20 MM HEI (M56A3)	900	Antimony Trisulfide	0.15
		Barium Nitrate	1.30
		Lead Azide	1.22
		Lead Styphinate	1.30
Fin Assembly	2,640	Antimony Trisulfide	0.066
		Lead Thiocyanate	0.193
Fuze (MK31 Mod 2)	600	Antimony Trisulfide	0.18
		Barium Nitrate	0.28
		Lead Azide	3.89
		Lead Styphinate	0.60

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* This is the rate at which these items can be incinerated in an APE 1236 rotary kiln. It is a representation of the quantity which could be open burned in one hour.

** 7000 grains/lb.

Comment Number: 4-G-7 (continued)
Docket Number: LD12-00023
Commenter: Reactive Waste Services, Inc.
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Comment: Explosive, Water Reactive, and Other Reactive Wastes

burning, the metal ion component of compounds, such as lead from lead azide, is evolved into the off gas stream and leave's the reaction site as an uncontrolled air pollutant. Metal ions from metal parts may also be volatilized or become particulates. For the purpose of these five examples, it is assumed that 100 percent of the metals in the explosive chemical compounds are emitted as air pollutants and no portion of the metallic component of the metal parts is emitted. Column 3 of Table 3 lists the pounds per hour of toxic or carcinogenic metals of each explosive chemical compound that is subjected to open burning for each of the 5 example open burns. Metallic components emissions were considered to be zero and are not shown.

No air emission standards exist for open burning. However, EPA has published metal and HCl emissions standards f[illegible] incinerators burning hazardous wastes in the document entitled, "Guidance on Metals and Hydrogen Chloride Controls for Hazardous Waste Incinerators[13]. For the five open burning examples given here, the emission for metals calculated for open burning are compared to the incineration standards. The comparisons were made via a ratio of calculated emissions for each metal over the allowable emissions from the EPA guidance document. Column 5 of Table 3 compares the calculated open burning emissions to the emissions allowed for an incinerator in a rural site in non-complex terrain with a 4 meter stack. Column 6 compares the calculated open burning emissions to the emissions allowed for an incinerator in a rural or urban site in complex terrain for a 4 meter stack. The 4 meter stack height was chosen because open burning on the ground produces a plume rise which can be approximated by a stack of this height.

Assumptions In The Example

Several assumptions were made in constructing the above example. These assumptions are discussed below and the manner in which air emissions of metals are impacted by these assumptions are discussed.

The quantity of waste burned in any one open burn can be highly variable and the values used in the example represent the volumes which can safely be fed to a rotary kiln. These are the feed rates specified by the U.S. Army for safe operation of their standard munitions incinerator. The Commenter is aware of open burn events where over 300,000 pounds of explosive waste were burned at one time. In comparison to volumes of that magnitude, the volumes of wastes shown in Table 2 are conservative. The example utilized an assumed 60 minute burn time. The assumption is conservative because actual open burns deactivate the majority of the highly energetic explosive waste in the first few minutes of the burn, and then burn more slowly for several hours until all the supplemental

Comment Number: 4-G-7 (Continued)

Docket Number: LD12-00023

Commenter: Reactive Waste Services, Inc.

Issue: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

Subissue: Explosive, Water Reactive, and Other Reactive Wastes

Comment:

TABLE 3

For each example item, the lbs./hour of metals burned and the calculated emissions are given. A ratio of these calculated emissions to the allowed emissions is then given.

Item Name	Metals In Explosive Compounds	Metals Burned lb/hr	Metal Emissions gm/sec	Ratio of Calculated Emissions to Allowable Emissions: Rural Non Complex	Ratio of Calculated Emissions to Allowable Emissions: Rural/Urban Complex
Detonator (M17)	Antimony	0.00000	0.00000	0.00000	0.00000
	Barium	0.00000	0.00000	0.00000	0.00000
	Chromium	0.00000	0.00000	0.00000	0.00000
	Lead	7.03661	0.88661	335.0765	748.57523
Fuze (MK43 Mod O)	Antimony	0.00000	0.00000	0.00000	0.00000
	Barium	0.00000	0.00000	0.00000	0.00000
	Chromium	0.00000	0.00000	0.00000	0.00000
	Lead	0.64770	0.08161	30.84301	68.90461
20 MM HEI (M56 A3)	Antimony	0.01382	0.00174	0.20036	0.44597
	Barium	0.08783	0.01107	0.00798	0.01689
	Chromium	0.00000	0.00000	0.00000	0.00000
	Lead	0.18558	0.02338	8.83706	19.74237
Fin Assembly	Antimony	0.01784	0.00225	0.25860	0.57560
	Barium	0.00000	0.00000	0.00000	0.00000
	Chromium	0.00000	0.00000	0.00000	0.00000
	Lead	0.01951	0.00246	0.92884	2.07507
Fuze (MK31 Mod 2)	Antimony	0.01106	0.00139	0.16029	0.35677
	Barium	0.01261	0.00159	0.00115	0.00243
	Chromium	0.00000	0.00000	0.00000	0.00000
	Lead	0.26001	0.03276	12.38127	27.66029

Comment Number: 4-G-7 (continued)
Docket Number: LD12-00023
Commenter: Reactive Waste Services, Inc.
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and Other Reactive Wastes

fuel is consumed. This results in most of the explosive waste contaminants being released during the first part of the burn. The assumption made here of the sixty minute burn time is entirely reasonable based on the kinetics of the combustion reaction and the excess quantity of supplemental fuel normally included in a burn in order to ensure the entire explosive waste mass is deactivated.

Volatilization of metals during high temperature reactions is well documented. Metal oxides are readily formed and if chlorine is present, metal emissions such as metal chloride are enhanced [21]. The emission of metals from burns involving metal parts also can contribute significantly to airborne metal emissions. Increased temperature, the presence of chlorides and the presence of the more volatile metals such as mercury, lead, and chromium all increase metal emissions. For the purpose of this example, D003 wastes containing metals in the explosive chemical compounds were used as examples. The assumption of 100 percent volatilization of the metal ions in the chemical compound is reasonable and the assumption that there is no volatilization from metal parts is conservative.

Comment Number: 4-G-7 (Continued)
Docket Number: LD12-00023
Commenter: Reactive Waste Services, Inc.
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and Other Reactive Wastes

Other Environmental Contaminant Pathways

Emissions from the supplemental fuel and reactive explosive waste subjected to open burning contain unburned organics, metals, organic products of incomplete combustion, and certain organic compounds synthesized during the combustion reaction. As has been previously stated, these reaction products contain toxic and carcinogenic compounds. Additionally, particulates, SOx, NOx, HCl, and other toxic gases are generated. These hazardous constituents take many pathways which impact human health and the environment. Quantification of these pathways is beyond the scope of this comment submission. However, a narrative description of potential pathways is provided below.

Hazardous constituents migrate directly from the burn site into underlying soils and via air to soils in the downwind vicinity of the burn area. Surface soils in the vicinity become contaminated from airborne emissions. Soil samples in open burning areas will verify this. Contaminated soils in turn cause surface and groundwater contamination, cause vegetative uptake and create contaminated particulates which are directly ingested by organisms and humans. Dermal contact with soils causes human uptake via skin absorption.

Contaminated ground and surface waters provide for bioaccumulation of metals and persistent organics in aquatic ecosystems and in fisheries. Humans drinking, showering, or swimming in contaminated waters are subject to ingestion and absorption of the contaminants.

Consumption of fish or shellfish from surface waters can cause further human ingestion. Impacts on vegetation, aquatic ecosystems, fisheries, terrestrial wildlife and humans can result. Open burning conducted on over long periods of time at a single location invariably results in contamination in a variety of environmental media.

Open burning sites around the U.S. have been contaminated with heavy metals and organic resulting from the incomplete combustion process. The Commenter highly recommends that EPA review case histories of CERCLA and RCRA contaminated sites caused by open burning. A summary of contamination data from these sites and a delineation of the contaminate migration pathways caused by open burning should be prepared. Data compiled from these sites should then be subject to an environmental contamination pathways analysis and to a complete quantitative risk assessment. Generation of such quantitative data will demonstrate the danger to human health posed by allowing the continuation of open burning.

Comment Number: 4-G-7 (continued)
Docket Number: LD12-00023
Commenter: Reactive Waste Services, Inc.
Issue: D003-Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and Other Reactive Wastes

Open Burning Permits Under Subpart X

The 40 CFR 264 Subpart X - Miscellaneous Units regulations establish environmental performance standards for open burning. The Agency has not specified design criteria, but instead, places the responsibility of protecting "human health and the environment" on the shoulders of the individual permit writers. The permit writer, via 40 CFR 264.601, is charged with issuing a permit that ensures the Miscellaneous Unit in which Open Burning/Open Detonation occurs "is located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment"[22]. According to the regulation, "protection of human health and the environment includes, but is not limited to:

* Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the groundwater or subsurface environment,

* Prevention of any releases that may have adverse effect on human health or the environment due to migration of waste constituents in surface water, or wetlands, or on the soil surface,

* Prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air."

Based on the actual process of open burning or open detonation, it is not possible for the Agency to issue a RCRA Permit for Open Burning or Open Detonation that complies with the Environmental Performance Standards identified in 40 CFR 264.601 when any amount of hazardous constituents are present in the waste. Any process which releases hazardous constituents to the environment during operation and which results in contamination of the site from the operation, clearly does not meet the statutory requirements of HSWA or the regulatory requirements of 40 CFR 264.601.

COMMENT NUMBER: 4-G-7
DOCKET NUMBER: LD12-00023
COMMENTER: Reactive Waste Services, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

With regard to open burning/open detonation, EPA is not responding substantively to this comment. The issue of whether open burning/open detonation is land disposal was settled in earlier rulemakings. See 51 FR 21011 (Nov. 7, 1986); 52 FR 21011 (June 4, 1987); and 53 FR 31158 (Aug. 17, 1988). EPA did not reopen this issue for comment, did not solicit comment, and is not responding substantively to those commenters raising the issue.

Comment Number: 4-G-8
Docket Number: LD12-00172
Commenter: HWTC
Issue: D003 – Characteristic Reactive Wastes and Part U
Subissue: Wastes containing reactive listing constituents – Explosive, Water Reactive, and other Reactive Wastes
Comment:

4. Incineration As BDAT For Explosive Wastes

The Agency has proposed the use of "deactivation" as the treatment standard for D003 explosive wastes, and included open burning and open detonation (OB/OD) in the realm of deactivation technologies to be considered BDAT. Using these later two methods of deactivation is both environmentally unsound and legally at odds with the statute's requirement for BDAT treatment. OB/OD is a major cause of numerous serious damage cases throughout the country, specifically resulting in the airborne dispersion of lead from these practices. Moreover, the Agency and several states are currently enforcing numerous consent decrees for the cleanup of major damage cases at OB/OD fields. The Agency's own records for this document over 229 separate Subpart X permit applications for these uncontrolled land disposal practices. OB/OD are forms of land disposal that by definition cannot represent BDAT treatment.

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Comment Number: 4-G-8 (continued)
Docket Number: LD12-00172
Commenter: HWTC
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing reactive listing constituents
Comment:

Moreover, they cannot satisfy the 3004(m) standard of "minimize" of threats to public health and the environment prior to land disposal. OB/OD constitute land disposal by virtue of consisting of waste piles that cannot compare to the treatment proficiency of other available technologies for D003 explosive wastes; reactive wastes rotary kiln incineration technology. OB/OD no more represent BDAT for explosive wastes than does land farming for KO48-KO52. It is the functional equivalent of air dispersion and ground spreading. Controlled rotary kiln units are currently in operation at several DOD facilities and other commercial units are in the process of being permitted to not only properly deactivate these wastes under controlled conditions, but also to do so in full compliance with RCRA 264, Subpart O incineration requirements. How can the Agency sanction a practice as BDAT when by definition it is a recreation of the very exposures, risks and damages that the land ban and RCRA seek to prevent?

Comment Number: 4-G-8 (continued)
Docket Number: LD12-00172.
Commenter: HWTC
Issue: D003- Characteristic Reactive Wastes and P and U Wastes containing reactive listing constituents.
Subissue: Explosive, Water Reactive, and other reactive wastes
Comment:

We would recommend that the Agency specify incineration as BDAT for a wide range of D003 as well as KO44-47 wastes, but provide a two year capacity variance to allow for the permitting of new facilities that are being constructed as well as the upgrading of existing DOD facilities that are currently operating albeit under conditions that fall far short of Part 264, Subpart O standards. This is an approach analogous to that employed for KO61 electric arc furnace dust, high zinc category. While the Agency and the nation may have to tolerate some limited OB\OD during the interim as a method to dispose of these wastes, protection of the environment and compliance with HSWA mandates that the least amount of OD\OD be allowed in the interim. The Agency can use its authority under RCRA 3004(j) codified at 40 C.F.R. 268.50 to allow for the storage of such waste residuals to facilitate proper treatment and disposal. While long term storage of these wastes may not be suitable for all subcategories, it is certainly applicable to munitions, cartridges, blasting caps, detonators, primers, etc., which are amenable to longer shelf life. In addition, we cross reference and support the comments submitted on this issue by Atlas Environmental, and HWTC member firm, and the comments of Reactive Waste Services, a non-HWTC firm.

COMMENT NUMBER: 4-G-8
DOCKET NUMBER: LD12-00172
COMMENTER: HWTC
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

With regard to open burning/open detonation, EPA is not responding substantively to this comment. The issue of whether open burning/open detonation is land disposal was settled in earlier rulemakings. See 51 FR 21011 (Nov. 7, 1986); 52 FR 21011 (June 4, 1987); and 53 FR 31158 (Aug. 17, 1988). EPA did not reopen this issue for comment, did not solicit comment, and is not responding substantively to those commenters raising the issue.

Comment Number: 4-G-9
Docket Number: LD12-00194
Commenter: Rohn and Haas
Issue: D003: Characteristic Reactive Wastes and P and U
Subissue: Wastes containing reactive listing constituents
Comment: — Explosive, Water Reactive, and other reactive wastes.

11. **Deactivation Is An Appropriate Treatment Standard For Many Of The D001, D002 And D003 Wastes.**

EPA proposes to establish a treatment standard of deactivation as a method of treatment for D001 ignitable reactives, D001 oxidizers, D002 other corrosives, D003 explosives, D003 water reactives, and D003 other reactives. See 54 Fed. Reg. at 48,419/3. R and H supports this proposed treatment standard.

There is a wide variety of wastes in these groups and many have unique treatment requirements. New research and development wastes also will sometimes be included in these waste groups. If not treated properly, these wastes can be very dangerous. It is important to have the flexibility to use a treatment method that is best suited for deactivating the particular waste. Therefore, we strongly support the Agency's proposal to make deactivation the treatment method for the above-noted wastes, and as discussed earlier, deactivation should also be the treatment standard for D003 wastewaters from HCN and ACN production.

COMMENT NUMBER: 4-G-9
DOCKET NUMBER: LD12-00194
COMMENTER: Rohm and Haas
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

EPA appreciates the commenter's support of "deactivation" as a treatment standard. The Agency believes that incineration is an applicable treatment technology for wastes in the D003 Reactive Explosives Subcategory, D003 Water Reactives Subcategory, and D003 Other Reactives Subcategory. See 40 CFR Section 268 Appendix VI for a list of other applicable technologies that used alone or in combination can achieve this technology standard.

The Agency has chosen a concentration based treatment level for wastes in the D003 Reactive Cyanide Subcategory rather than establish "Deactivation (DEACT) to Remove the Characteristic of Reactivity" for the following reasons: First, unlike the other characteristic wastes, the Agency can identify an indicator compound (i.e., cyanide) that is known to be present in all D003 reactive cyanide wastes and can analyze the indicator compound in wastewater and nonwastewater matrices with EPA-approved SW-846 analytical test methods. (See also Section III.A.6.(a) of today's preamble for a further discussion of cyanide treatment standards for other wastes and a clarification of the analytical methodology for compliance with the promulgated standards). Second, EPA believes most D003 cyanide wastes are generated from the same types of processes that generate the F006-F012 and P030 wastes and thus are frequently of the same type, and therefore, present similar risks when land disposed as the listed wastes from the same processes. EPA does not believe that Congress precluded the Agency from establishing the same treatment standards for the D003 wastes that have been established for

COMMENT NUMBER: 4-G-9 (Continued)
DOCKET NUMBER: LD12-00194
COMMENTER: Rohm and Haas
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

the listed wastes (assuming, of course, that such standards are consistent with the command of section 3004(m) to reduce toxicity or mobility so that risks to health and the environment are minimized). Finally, the agency suspects that some generators are currently misclassifying F006-F012 and P030 wastes as D003 cyanide wastes. While this is primarily an issue for enforcement, the Agency is concerned that a less stringent standard would discourage proper identification of the F and P cyanide wastes.

Comment Number: 4-G-10
Docket Number: LD12-00206
Commenter: University of Washington
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: -Explosive, Water Reactive, and other Reactive Wastes

2. Definition of deactivation and verification of complete treatment. We support the general concept of specifying "deactivation as a method" for a treatment standard for certain D001, D002 and D003 categories of waste. However, we foresee certain problems with this method related to the vagueness of the term. For example, in the case of a D001 oxidizer, one form of deactivation would be chemical reduction. By what criteria will facilities determine when the waste is adequately reduced (i.e. deactivated)? The same problem holds true for D003 explosives, water reactives, and other reactives.

Use of dilution prior to treatment of D003 explosive and other reactives subcategories. The proposed rule included much discussion on prohibited dilution of reactive wastes. We agree that dilution may not constitute adequate treatment in most cases and support the dilution prohibition in principle. However, the prohibition must allow dilution for the purpose of safe handling of D003 explosive and other reactive wastes. Dilution is often necessary for safe handling, transportation and treatment of these materials.

COMMENT NUMBER: 4-G-10
DOCKET NUMBER: LD12-00206
COMMENTER: University of Washington
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

EPA agrees with the commenter that guidance should be given to help the regulated community understand what is meant by "deactivation". EPA has developed a list of applicable technologies for each subcategory where "deactivation" is the promulgated standard. See 40 CFR Section 268 Appendix VI for a list of technologies that can achieve the "deactivation" standard. See also 40 CFR Section 268.42 Table 1 for a description of the technologies indicated by a five letter code. In many cases, EPA recommends that a surrogate compound should be used to determine if treatment has been completed.

The Agency agrees with the commenter that mixing explosive wastes with water (for safety reasons and prior to chemical treatment) is not an impermissible form of dilution.

Comment Number: 4-G-11

Docket Number: LD12-00235

Commenter: Explosive Technologies International

Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents

Subissue: —Explosive, Water Reactive, and other reactive wastes

Comment:

1. Deactivation as a Treatment Standard

The Agency has proposed a general treatment standard of "Deactivitation as a Method of Treatment" for two subcategories of characteristic waste which are associated with manufacturing and handling of commercial explosives (D001 Oxidizers and D003 Explosives). The Agency has appropriately stated a significant reality associated with these type waste and I quote "The Agency has determined that within each of these subcategories there appear to be a further variety of different waste groups, each with a certain degree of uniqueness with respect to hazard and handling requirements." We are in total agreement with the Agency's conclusion that, "... the actual method of 'Deactivation' chosen for each waste may be specific to that waste and may be best determined by the generator or the treater most knowledgeable as to the waste's unique hazards and handling requirements."

We are also in agreement with the Agency's conclusion that "the hazardous characteristic of these wastes is based upon the imminent hazard (i.e., oxidizers can react violently with organics or other materials and result in the rapid generation of fires, explosivity)".

Based upon the above data, we recommend that for these wastes (D001 Oxidizers and D003 Explosives) a "noncharacteristic" based treatment standard be established instead of a "technology" based treatment standard. This type of "performance" regulation focuses on the desired objective (the elimination of imminent hazardous characteristic of the waste) rather than focusing upon the process for reaching the objective. Management of a regulation which focuses upon the process will be a significant task, for both the Agency and the generator or treater with little or no benefit to the environment. Possibly you would want to use the specific titles of "Nonoxidizable" and "Nonreactive" for the treatment standards for these wastes.

Comment Number: 4-6-11 (continued)
Docket Number: LD12-00235.
Commenter: Explosive Technologies International
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: Explosive, Water Reactive, and other reactive wastes
Comment:

2. Explosives Subcategory D003 Waste

All discussions of the treatment of this waste must always include open burning and open detonation as viable treatments. These treatment methods are the standard for the commercial explosives industry and represent the safest and most effective methods available to our industry for elimination of the imminent hazard associated with these waste. Data associated with these treatment technologies can be found in the "RCRA Guidance Manual For Permitting Commercial Explosives Industry Open Burning/Open Detonation Units" by the Institute of Makers of Explosives. To eliminate any possible misunderstanding about the viability of these treatments, we recommend open burning and open detonation be listed whenever examples of acceptable treatment technology are given in preambles or other documents relating to this regulation.

4. Potential Exclusion of Dilution of D003 Explosives

On Page 48426, the Agency states the treatment of reactive wastes does not automatically include dilution. The justifications given for this potential prohibition are that: (1) the reactive waste may contain cyanides or sulfides or (2) the reactive waste will react violently with water. D003 Explosives will not contain cyanides or sulfides. D003 Explosives do not react violently with the addition of water and many times this is the safest method of response to eliminate the "imminent hazard" characteristic (particularly during emergency conditions).

Since addition of water may be the most desirable alternative to eliminate the "imminent hazard" characteristic of this type waste during certain situations and the justifications presented for not automatically permitting dilution do not apply to D003 Explosives, we recommend that dilution be automatically included for D003 Explosives.

Thank you for your consideration of our comments as a major North American manufacturer of commercial explosives.

COMMENT NUMBER: 4-G-11
DOCKET NUMBER: LD12-00235
COMMENTER: Explosive Technologies International
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency agrees with the commenter that one technology cannot be specified to treat all wastes included in each subcategory and appreciates the commenter support for the "deactivation" standard. The Agency has promulgated "deactivation to remove the characteristic" as a treatment standard for some subcategories to render them nonreactive, noncorrosive, and nonignitable according to regulatory definitions. Although open burning and open detonation technologies can be used to deactivate, EPA recommends that they be used only in situations that pose an imminent, substantial threat of discharge where wastes consequently cannot be transported or treated otherwise in a safe manner. EPA believes that in some cases it may be desirable and appropriate for a waste to be mixed with water to reduce the potential for explosion and thus, to ensure safe handling and/or transportation for subsequent incineration or chemical treatment. If the waste material can be safely transported according to DOT requirements and accepted by a treatment facility, the Agency recommends that technologies such as incineration, chemical oxidation, or chemical reduction should be used to remove the characteristic of ignitability and/or reactivity. See 40 CFR Section 268 Appendix VI for a list of applicable technologies that used alone or in combination can achieve this technology standard. See also Section 268.42 Table 1 for a detailed description of all technologies referred to by a five letter technology code.

COMMENT NUMBER: 4-G-11 (continued)
DOCKET NUMBER: LD12-00235
COMMENTER: Explosive Technologies International
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency agrees with the commenter that mixing explosive wastes with water (for safety reasons and prior to chemical treatment) is not an impermissible form of dilution.

Comment Number: 4-G - 12

Docket Number: LD12 - 00255

Commenter: Ensign - Bickford Industries, Inc.

Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents

Subissue:

Comment: — Explosive, Water Reactive, and other Reactive Wastes

Gentlemen:

This letter is written to comment on your proposed rule for Land Disposal Restrictions for Third Scheduled Wastes. My concern is with the proposed treatment standards for ignitable, corrosive, and reactive wastes and specifically reactive characteristic wastes.

I am in support of the Deactivation Treatment Standard and agree with EPA's statement that

> ... the actual method of "Deactivation" chosen for each waste may be best determined by the generator or the treater most knowledgeable as to the waste's unique hazards and handling.

This is a reasonable approach and recognizes that the industry's primary safety concern is to render these materials non-reactive. It also recognizes that flexibility is needed in that one method of treatment is not appropriate for all wastes.

I am concerned, however, that "open burning" is conspicuous by its absence in the language of the preamble. In the preamble, examples of deactivation are given several times such as:

> ...deactivation (e.g. open detonation, thermal destruction, specialized incineration, chemical oxidation, chemical reduction, and controlled reaction with water).

and,

> ... the Agency is allowing the regulated community to use the treatment technology (e.g. incineration, chemical deactivation) that best fits the type of explosive waste.

It is not clear anywhere that open burning is an option, although "thermal destruction" may be interpreted to mean or include open burning.

Comment Number: 4-G-12 (continued)
Docket Number: LD12-00255
Commenter: Ensign-Bickford Industries, Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: Explosive, Water Reactive, and other Reactive Wastes

The commercial explosives industry uses open burning (this is acknowledged in the preamble) and open detonation as the primary methods for safely treating explosives and explosives contaminated wastes, yet open burning is not specifically acknowledged as a "deactivation" method. Open burning will still be a necessary treatment method for some time. In order to preclude any misunderstandings, the language of the preamble should be changed or clarified to specifically designate open burning as an option for deactivation.

Thank you for this opportunity to comment on your proposed rule.

COMMENT NUMBER: 4-G-12
DOCKET NUMBER: LD12-00255
COMMENTER: Ensign-Bickford Industries, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency agrees with the commenter that one technology cannot be specified to treat all wastes included in each subcategory and appreciates the commenter support for the "deactivation" standard. The Agency has promulgated "deactivation to remove the characteristic" as a treatment standard for some subcategories to render them nonreactive, noncorrosive, and nonignitable according to regulatory definitions. Although open burning and open detonation technologies can be used to deactivate, EPA recommends that they be used only in situations that pose an imminent, substantial threat of discharge where wastes consequently cannot be transported or treated otherwise in a safe manner. EPA believes that in some cases it may be desirable and appropriate for a waste to be mixed with water to reduce the potential for explosion and thus, to ensure safe handling and/or transportation for subsequent incineration or chemical treatment. If the waste material can be safely transported according to DOT requirements and accepted by a treatment facility, the Agency recommends that technologies such as incineration, chemical oxidation, or chemical reduction should be used to remove the characteristic of ignitability and/or reactivity. See 40 CFR Section 268 Appendix VI for a list of applicable technologies that used alone or in combination can achieve this technology standard. See also Section 268.42 Table 1 for a detailed description of all technologies referred to by a five letter technology code.

Comment Number: 4-G-13
Docket Number: LD12-00267
Commenter: Allied Signal, Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue: —Explosive, Water Reactive, and other reactive wastes
Comment:

VIII. Deactivation is an Appropriate Treatment Standard for Those D001, D002, and D003 Wastes for Which It Has Been Proposed

EPA has proposed "deactivation as a method of treatment" for several subcategories of D001, D002, and D003 wastes. As we understand it, "deactivation" refers to any treatment that removes the characteristic. *See* 54 *Fed. Reg.* 48419. Examples of "deactivation" include open detonation, thermal destruction, specialized incineration, chemical oxidation, chemical reduction, and controlled reaction with water. *Id.* This list, however, is illustrative only because "the Agency believes that the actual method of "deactivation" chosen for each waste may be specific to that waste and may be best determined by the generator or the treater most knowledgeable as to the waste's unique hazards and handling requirements." *Id.*

Comment Number: 4-G-13 (continued)
Docket Number: L012-00267
Commenter: Allied Signal, Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: — Explosive, Water Reactive, and other reactive wastes

Allied completely agrees with EPA's premise. The wastes involved are dangerous wastes that present direct and immediate threats to the safety of the generator's employees. The generator must be given the flexibility to determine the best methods of handling and treating these wastes so as to minimize the dangers they pose to the employees. The requirement of "deactivation" will assure that these wastes are accorded genuine treatment that destroys the hazardous characteristic, while maintaining the generator's maximum flexibility to deal with the vagaries of the particular substance involved, in a way presenting the least danger to the generator's employees at the particular facility and treatment facility involved.*

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* We believe that this proposed treatment method should be the equivalent of "no land disposal," but that, in light of other aspects of the preamble, it is not. The concerns of some commenters to previous land disposal restriction rules over the effect of a "no land disposal" treatment standard, *id.*, should not be relevant to characteristic wastes, because once the characteristic waste loses its characteristic it ceases to be a hazardous waste. However, in light of the legally erroneous interpretation of Section 3004(m) announced in the preamble, such that a characteristic waste "destined" for land disposal would become subject to the treatment standard at the point of generation and would remain subject to the treatment standard even after ceasing to be a hazardous waste, a "no land disposal" treatment standard would be a totally inappropriate standard. It would preclude any land disposal of the harmless residue of any of the various deactivation methods that might be applicable to the particular waste.

Comment Number: 4-G-13 (continued)
Docket Number: LD12-00267
Commenter: Allied Signal, Inc.
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: Explosive, Water Reactive, and other Reactive Wastes

The option of specifying one technology, such as open detonation, for all of these wastes would be a serious mistake. It would impose a serious burden on EPA through the variance procedure, and, more important, it would create substantial regulatory uncertainty until EPA could deal with the variances. Further, this regulatory uncertainty could lead some generators to attempt to utilize the specified technology, even if inappropriate, with potentially very serious consequences to safety. Generators should not be confronted with a choice between compliance with EPA's regulations, on the one hand, and the safety of their employees, on the other.

For example, if the treatment standards required open detonation for "other reactive" wastes, then Allied would be forced to choose between complying with this treatment method for its chlorosilane wastes generated at its Delaware Valley Works, or continuing its much safer existing practice of sending these wastes to an incinerator in specially packaged one-gallon glass containers. The availability of a treatability variance to resolve issues like this is inadequate for two reasons: First, EPA is unlikely to be able to review and act on all such variance requests by the May 8, 1990 effective date of the treatment standard, and, therefore, for some uncertain period of time, Allied would be confronted with this unfair choice between complying with regulatory requirements, on the one hand, and taking those actions most protective of the safety of its employees. Second, some companies other than Allied could well decide that the costs and burdens of seeking such a variance are not worth the effort, even if it means that the safety of their employees would be adversely affected. This would be an intolerable situation, but entirely predictable. EPA must not create disincentives for companies to protect their employees.

COMMENT NUMBER: 4-G-13
DOCKET NUMBER: LD12-00267
COMMENTER: Allied Signal, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency acknowledges and thanks this commenter for the support of deactivation as a treatment standard. The Agency believes that because of the diversity of waste streams and treatment technologies applicable to many of the characteristic wastes, that a treatment standard of deactivation is best. This standard will allow generators and treaters the needed flexibility to select the technology that is best suited to remove the hazardous characteristic of the waste. A list of technologies that when used alone or in combination can achieve the "deactivation" treatment standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-G-14
Docket Number: L010-00048
Commenter: the Dow Chemical Company
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and Other Reactive Wastes

XX. THE HARD HAMMER SHOULD NOT BE ALLOWED TO FALL ON D003 WASTES CLASSIFIED AS "OTHER REACTIVES."

Certain organic wastes which are not P or U listed could be D003 "other reactives." For example, isocyanate process wastes which do not meet any definition for the K, P or U listing. Rather than letting the hard hammer fall, a technology standard requiring incineration for such organic D003 wastes should be promulgated. This would allow continued safe treatment of such wastes with land disposal of any treatment generated residues.

COMMENT NUMBER: 4-G-14
DOCKET NUMBER: LD10-00048
COMMENTER: Dow Chemical Company
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency believes that because of the diversity of waste streams and treatment technologies applicable to many of the characteristic wastes, that a treatment standard of deactivation is best. This standard will allow generators and treaters the needed flexibility to select the technology that is best suited to remove the hazardous characteristic of the waste. The Agency has data to suggest that technologies such as incineration and different types of chemical deactivation can be used to treat the waste to remove the characteristic of reactivity. A list of technologies that when used alone or in combination can achieve the "deactivation" treatment standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-G-15
Docket Number: L010-00028
Commenter: Department of Energy
Issue: D003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: Explosive, Water Reactive, and other Reactive Wastes

8) 54 FR 1097, D003 Reactive Wastes

The following language in the Explosives and Water Reactives Subcategories discussion is unclear: "By establishing (No Land Disposal Based on Deactivation) as a treatment standard, the Agency believes that the variance procedures could be used as a method of providing a more complete evaluation of the safety hazards associated with each individual deactivation or open detonation." It is DOE's understanding that, by use of the "No Land Disposal Based on . . . " verbiage, specified treatments are not precluded as long as, following treatment, the waste no longer exhibits the characteristic (see discussion pertaining to D001 Ignitable Liquids Subcategory at 54 FR 1094). With such an interpretation, there is no need to obtain a variance for treatment, and thus DOE questions the notion that variance procedures will be pursued for individual deactivation or detonation operations. The same comment applies to the discussion on page 54 FR 1094 relating to variances for D001 Ignitable Reactives.

DOE strongly supports the allowance of any treatment technology that renders D003 waste non-reactive. DOE does not support having to rely on individual variances for treatment of D003 wastes. Such a process is time consuming for both the generator and EPA. The very nature of D003 wastes is that they may be acutely dangerous materials and may therefore require deactivation in as rapid a time frame as possible.

COMMENT NUMBER: 4-G-15
DOCKET NUMBER: LD10-00028
COMMENTER: Department of Energy
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: Explosive, Water Reactive, and Other Reactive Wastes
RESPONSE:

The Agency acknowledges and thanks this commenter for the support of deactivation as a treatment standard. The Agency believes that because of the diversity of waste streams and treatment technologies applicable to many of the characteristic wastes, that a treatment standard of deactivation is best. This standard will allow generators and treaters the needed flexibility to select the technology that is best suited to remove the hazardous characteristic of the waste. A list of technologies that when used alone or in combination can achieve the "deactivation" treatment standard is included in 40 CFR 268 Appendix VI.

Comment Number: 4-H-1
Docket Number: LD12-00115
Commenter: Aqua-Tech Groce Laboratories
Issue: D003-Characteristic Reactive Wastes and P and U Wastes
Subissue: Containing Reactive Listing Constituents
Comment: P and U Waste Issues

Under III A.4.f., thermal destruction is proposed as BDAT for various incinerable inorganics such as phosphine gas (P096) and hydrogen sulfide gas (U135). Both gases are flammable and toxic to inhalation. Our experience in treating these gases by controlled reaction with aqueous solution of potassium permanganate affords us the margin of safety that vending into an incinerator does not. Both gases, when heated, emit highly toxic oxides, either sulfur or POX. We request that chemical oxidation be a method of treatment for these two gases.

COMMENT NUMBER: 4-H-1
DOCKET NUMBER: LD12-00115
COMMENTER: Aqua-Tech, Groce Laboratories
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

The Agency acknowledges and agrees with the commenter that chemical oxidation can be used to treat phosphine gas (P096) and hydrogen sulfide gas (U135). The Agency is revising its treatment standards so that established destruction methods other than incineration may be used for these wastes. Therefore, the Agency is promulgating a treatment standard of "Incineration (INCIN), Chemical Oxidation (CHOXD), or Chemical Reduction (CHRED) as Methods of Treatment" for P096 and U135 wastes. See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter technology code in the parenthesis.

Comment Number: 4-H-2
Docket Number: LD12-00124
Commenter: Rollins
Issue: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: P and U Waste Issues
Comment:

EPA proposes "solubilization in water followed by precipitation as calcium fluoride" as a required treatment technology for P056 and U134 non-wastewaters. These fluorine compounds are safely incinerated at present, and incineration should be an allowed treatment technology.

For the incinerable inorganics P006, P096, P105, P122, U135, U189 and U249, EPA proposes "thermal destruction" as the required treatment for the nonwastewater forms, in which RES concurs. However, EPA proposes "chemical oxidation followed by precipitation as insoluble salts" as the required treatment for the wastewater forms. RES thermally oxidizes these wastewater forms and believes there is no reason why this treatment technology should be precluded. Accordingly, we recommend that thermal oxidation be an allowed treatment technology for these wastewaters.

COMMENT NUMBER: 4-H-2
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

In reference to P056 and U134 nonwastewaters, the Agency is promulgating a treatment standard of "Adsorption (ADGAS) followed by Neutralization (NEUTR) as a Method of Treatment" for P056 nonwastewaters and "Neutralization (NEUTR) or Adsorption (ADGAS) followed by Neutralization (NEUTR) as Methods of Treatment" for U134 nonwastewaters since this waste can exist as an acidic solution or a gas. See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

EPA has reconsidered the "insoluble salts" requirement and believes that generally P056 and U134 wastes are generated in such small quantities that it places a large burden on treatment facilities treating these wastes by chemical treatment to require use of chemicals that will precipitate a small portion of their total waste volume to insoluble salts when other chemicals may be more desirable for their specific treatment needs. EPA also believes that the individual facility discharge limits for fluoride will control releases into the environment of any soluble compounds generated as a result of treating these compounds. Therefore, the Agency is not finalizing the insoluble salt requirement.

EPA also believes "adsorption" instead of "solubilization" better describes the process of releasing a gas into a liquid media and that "neutralization" of the resulting acidic waste is a more desirable

COMMENT NUMBER: 4-H-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

treatment process instead of precipitation to insoluble salts." The Agency made this decision as a result of information indicating that most facilities are currently treating gaseous forms of P056 and U134 by reacting the gases with alkaline solution and that it is common practice to neutralize waste hydrofluoric acid (U134).

The Agency is not precluding incineration for P056 and U134 nonwastewaters as long as the acid off-gases are scrubbed with alkaline reagents to achieve the treatment standard of "Adsorption (ADGAS) followed by Neutralization (NEUTR)." In this case, the water will act as the adsorbent and the alkaline reagents will neutralize the acidity.

In reference to P006, P096, P105, P122, U135, U189, and U249 wastewaters, the Agency agrees with the point made by this commenter. Based on information submitted by commenters, the Agency has reconsidered the technologies proposed as BDAT for these wastewaters.

The Agency believes that thermal and chemical destruction technologies such as incineration, chemical oxidation and chemical reduction provide safe and effective treatment. Therefore, the Agency is promulgating a treatment standard of "Incineration (INCIN), Chemical Oxidation (CHOXD), or Chemical Reduction (CHRED) as Methods of Treatment" for P006, P096, P105, P122, U135, U189, and U249 wastewaters. See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

COMMENT NUMBER: 4-H-3
DOCKET NUMBER: LD12-00088
COMMENTER: INCO UNITED STATES, INC
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE:
COMMENT: P and U Waste Issues

Fifth, it is not realistic or practical to specify "Recovery as a Method of Treatment" for waste code P073, which applies to discarded commercial chemical products, off-specification species, container residues, and spill residues of nickel carbonyl. We believe that very little, if any, P073 waste is generated in the United States. Even if it is generated, the extremely short half-life of nickel carbonyl in air and the risks associated with acute exposures to nickel carbonyl lead us to believe that recovery of P073 is neither feasible nor safe. Instead, we suggest that thermal destruction be designated as the method of treatment for P073.

V. Thermal Destruction, Rather than Recovery, Should Be Designated as the Method of Treatment for P073.

In the rulemaking notice, P073 (which refers to discarded commercial chemical products, manufacturing intermediates, off-specification species, container residues, and spill residues of nickel carbonyl) is grouped with P015 (beryllium dust) and P087 (osmium tetroxide) in a category that EPA describes as "metal wastes that have a high potential for recovery."[19] According to EPA, available information "indicates that recovery of these metallic elements [i.e., beryllium, osmium, and nickel] from these waste[s] is feasible and is currently

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[19] See 54 Fed. Reg. at 48428/2.

COMMENT NUMBER: 4-H-3 Continued
DOCKET NUMBER: LD12-00088
COMMENTER: Inco United States Inc
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: P and U Waste Issues

practiced."20/ Consequently, EPA "is proposing a standard of 'Recovery as a Method of Treatment' for both nonwastewater and wastewater forms of these wastes."21/

We have no information or experience relating to the recovery of beryllium from beryllium dust or osmium from osmium tetroxide. But we are familiar with nickel recovery processes, and we are not aware that recovery of nickel from a P073 nickel carbonyl waste is currently being practiced. Moreover, we seriously doubt that recovery of nickel from P073 wastes is feasible or, when industrial hygiene considerations are taken into account, advisable.

In the first place, it is highly unlikely that any significant quantities of P073 wastes are generated in the United States, since nickel carbonyl is not widely used. Moreover, nickel carbonyl has a half life of approximately 100 seconds in air. Thus, if nickel carbonyl were present in a solid waste such as a container residue or spill residue, it would react with the air and quickly decompose. No significant amount of nickel would be available for recovery.

20/ Id.

21/ Id.

COMMENT NUMBER: 4-H-3 continued
DOCKET NUMBER: LD12-00088
COMMENTER: Inco United States Inc.
ISSUE: D003-Characteristic Reactive Wastes and P and U Wastes
SUBISSUE: Containing Reactive Listing Constituents
COMMENT: P and U Waste Issues

Furthermore, because of its high acute toxicity, elaborate precautions are taken to protect workers against exposure to nickel carbonyl. At Inco's Canadian and Welsh facilities where nickel carbonyl is produced, we take great care to ensure that leaks do not occur and that workers do not handle any materials that may have been contaminated with nickel carbonyl. If materials do become contaminated with nickel carbonyl, they are destroyed through incineration.

In short, we think it highly unlikely that nickel currently is being recovered from P073, and we do not believe that recovery of nickel from nickel carbonyl wastes is economically feasible or advisable as a matter of industrial hygiene. Accordingly, EPA should specify "Thermal Destruction" or "Incineration," rather than "Recovery," as the method of treatment for P073.

COMMENT NUMBER: 4-H-3
DOCKET NUMBER: LD12-00088
COMMENTER: Inco United States, Inc.
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

The Agency acknowledges the points made by this commenter. The Agency received several comments indicating that recovery is not always appropriate for P073 because of the low volumes of wastes involved. Incineration will convert the carbonyl to nickel oxide and carbon dioxide gas. Air pollution control devices on the incinerator will remove the nickel oxide particulates formed. As a result, the Agency agrees with the commenter that incineration is also an applicable process.

Comment Number: 4-H-4
Docket Number: LD12-00129
Commenter: Olin Chemicals
Issue: D003-Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
Subissue: P and U Waste Issues
Comment:

Fluorine Compounds (III.A.4.f.(2))

As a point of information, Olin wishes to point out that the 40 CFR 261.33(f) listing for U134 is Hydrogen Fluoride (C,T) and Hydrofluoric Acid (C,T). Hydrofluoric acid is normally an aqueous solution and hydrogen fluoride is either a gas or liquid. We do concur that U134 hydrofluoric acid is "... highly reactive and highly corrosive...".

As is stated above (see D002 comments), the Agency gives no real scientific rationale for requiring BDAT as an insoluble salt (Calcium Fluoride). Quite often these wastes are treated and discharged in either NPDES or POTW units. These units, quite often, have non-RCRA regulated surface impoundments associated with them. The treatment process does not necessarily produce calcium fluoride yet the POTW will accept the discharge which is within its Pretreatment Requirements. By specifying the insoluble salt Calcium Fluoride, the Agency is requiring that facilities that handle hydrofluoric acid or hydrogen fluoride to use lime in their treatment plants. This may not be compatible with other waste streams or the lime may not be available at a particular location.

Generally, wastewater treatment facilities use caustic solutions in their neutralization systems because of the ease of handling a liquid rather than the dry lime material. The reaction between hydrogen fluoride/hydrofluoric acid and caustic produces the soluble salt sodium fluoride (NaF).

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Comment Number: 4-H 4 continued

Docket Number: LD12-00129

Commenter: Olin Chemicals

Issue: D003-Characteristic Reactive Wastes and P and U Wastes

Subissue: Containing Reactive Listing Constituents

Comment: P and U Waste Issues

In low concentrations, this salt is used as a fluoridation chemical in drinking water and the toothpaste industry. Limitations on the discharge of NaF should be left to the water division and the states.

Olin recommends that the BDAT for U134 waste be "Solubilization in Water Followed by Neutralization to 2<pH<12.5."

COMMENT NUMBER: 4-H-4
DOCKET NUMBER: LD12-00129
COMMENTER: Olin Chemicals
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

The Agency is promulgating a treatment standard of "Neutralization (NEUTR) or Adsorption (ADGAS) followed by Neutralization (NEUTR) as Methods of Treatment" for U134 nonwastewaters since this waste can exist as an acidic solution or a gas. See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter technology code in the parentheses.

EPA decided not to finalize the "insoluble salts" requirement and believes that generally U134 wastes are generated in such small quantities that it places a large burden on treatment facilities treating these wastes by chemical treatment to require use of chemicals that will precipitate a small portion of their total waste volume to insoluble salts when other chemicals may be more desirable for their specific treatment needs.

Comment Number: 4-H-5
Docket Number: LD12 - 00175
Commenter: Brush-Wellman
Issue: D003- Characteristic Reactive Wastes and P and U
Subissue: Wastes containing reactive listing constituents
Comment: P and U Wastes Issues

Brush Wellman Inc. ("Brush") submits the following comments with respect to the proposed rule regarding land disposal restrictions for the "third third" scheduled wastes. Brush is one of the two exclusive primary producers of beryllium and beryllium-containing products in the United States. Because of its product base and long history of careful attention to and compliance with applicable environmental, health and safety standards, Brush is uniquely qualified to comment on proposed regulations concerning wastes associated with the beryllium industry.

The Agency has proposed to promulgate a treatment standard of "Recovery as a Method of Treatment" for P015-Beryllium dust. While Brush's experience indicates that only very small quantities of P015 are generated at any one time, recovery is a viable and preferred treatment method in light of the high economic value of the recovered beryllium. If Brush were to generate any P015 wastes, it would first attempt to recover the beryllium from the wastes. Such recovery would directly address any concerns regarding the potential reactivity of the wastes because they would be managed in the same processes in which the pure material is handled on a regular basis.

Comment Number: 4-H-5 (continued)
Docket Number: LD12-00175.
Commenter: Brush Wellman, Inc.
Issue: D003 – Characteristic Reactive Waste and P and U Wastes containing reactive listing constituents
Subissue: — P and U Waste Issues
Comment:

In sum, recovery of beryllium from P015 wastes is practical, sensible and fully protective of the environment. Brush urges EPA to adopt as final its proposed treatment standard of recovery for P015 wastes.

COMMENT NUMBER: 4-H-5
DOCKET NUMBER: LD12-00175
COMMENTER: Brush-Wellman
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

The Agency acknowledges and thanks this commenter for the support of the proposed treatment standard for P015 wastes. The Agency is promulgating a treatment standard of "Recovery (RMETL or RTHRM) as a Method of Treatment" for P015 wastes. See 40 CFR 268.42 Table 1 for detailed description of the technology standard referred to by the five letter technology code in the parenthesis.

Comment Number: 4-H-6
Docket Number: LD12-00206
Commenter: University of Washington
Issue: D003: Characteristic Reactive Wastes and P and U Wastes Containing reactive listing constituents
Subissue:
Comment: → P and U Waste Issues

Treatment standard for P015, P073 and P087. We object in principle to a treatment standard of "Recovery as a method of treatment". There are inevitably cases where recovery is not feasible. We urge EPA to develop quantitative or alternate technology standards.

COMMENT NUMBER: 4-H-6
DOCKET NUMBER: LD12-00206
COMMENTER: University of Washington
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

The Agency agrees that it may not always be practical to recover nickel in small quantities of P073 wastes. The Agency has decided to develop concentration-based standards for P073 nonwastewaters and wastewaters because the Agency has treatment performance data for nickel. EPA has performance data for chemical treatment of nickel in wastewaters believed to be similar to P073 wastewaters and stabilization data for nickel in nonwastewaters believed to be similar to P073 nonwastewaters. Based on these performance data, EPA is promulgating a concentration-based standard of 0.32 mg/l nickel for P073 nonwastewaters and a concentration-based standard of 0.44 mg/l nickel for P073 wastewaters. This standard will allow generators the flexibility to use any appropriate method of treatment such as thermal destruction or recovery, to achieve the numerical standards.

This commenter also stated that the recovery of P015 and P087 wastes is sometimes not feasible. The Agency received neither performance data nor information regarding alternate treatment methods for these compounds during the comment period and has no performance data in the BDAT data base to develop concentration-based treatment standards. On the other hand, the Agency did receive a comment from a producer of beryllium and beryllium-containing products which said that although only very small quantities of P015 are generated at any one time, recovery is a viable and preferred treatment method in light of the high economic value of the recovered beryllium. Additionally, the Agency is aware that it is current practice to recover osmium from P087 using bench-scale technologies because of the high economic value of the recovered osmium.

COMMENT NUMBER: 4-H-6 (continued)
DOCKET NUMBER: LD12-00206
COMMENTER: University of Washington
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

Consequently, the Agency believes that recovery is BDAT for P015 and P087 nonwastewaters and wastewaters and is promulgating "Recovery (RMETL or RTHRM) as a Method of Treatment" for all forms of P015 and P087. See 40 CFR 268.42 Table 1 for a detailed description of the technology standard referred to by the five letter code in the parenthesis.

Comment Number: 4-H-7
Docket Number: L010-00034
Commenter: CMA
Issue: 0003 - Characteristic Reactive Wastes and P and U
Subissue: Wastes Containing Reactive Listing Constituents
Comment: P and U Reactive Waste Issues

The EPA's intent with respect to reactive waste is unclear (III.A.9.f.)

At 54 FR 1092, EPA implies that it intends to propose a testing strategy for reactive P and U wastes (as opposed to BDAT or numerical standards). Notwithstanding our contention (above) that such wastes are not subject to the hard hammer, CMA believes that EPA should establish BDAT wherever possible. To the extent that the proposal to solicit data in lieu of a BDAT standard confirms our opinion that there is no hard hammer involved, we concur. In the alternate, however, we strenuously urge the Agency to establish technology-based requirements.

COMMENT NUMBER: 4-H-7
DOCKET NUMBER: LD10-00034
COMMENTER: CMA
ISSUE: D003: Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
SUBISSUE: P and U Waste Issues
RESPONSE:

The Agency develops numerical treatment standards (as opposed to standards based on method of treatment) only in cases where it has sufficient approved analytical test methods for the constituents and data to justify such a numerical standard. For most of the reactive P and U constituents there exist no analytical methods, consequently no performance data can be developed for these wastes. For the constituents that do have analytical methods, the Agency at the time of proposal did not have sufficient information on treatment of several of these P and U wastes around which specific numerical treatment standards could be set. The Agency did, however, have sufficient information to establish standards based on methods of treatment for all the reactive P and U wastes.